United States Department of Agriculture

Natural Resources Conservation Service

In cooperation with the Tennessee Agricultural Experiment Station, the Jefferson County Board of Commissioners, and the Tennessee Department of Agriculture

Soil Survey of Jefferson County, Tennessee

Detailed maps are available in two formats. Digital copies (SSURGO) that can be used in a Geographic Information System (GIS) can be accessed at http://www.ftw.nrcs.usda.gov/ssur_data.html. (The State Soil Survey Area ID is TN089.) Paper copies of the maps can be obtained from the Natural Resources Conservation Service, 1230 Circle Drive, Dandridge, TN 37725 (telephone number 423-397-3151).

How to Use This Soil Survey

General Soil Map

The general soil map, which is a color map, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

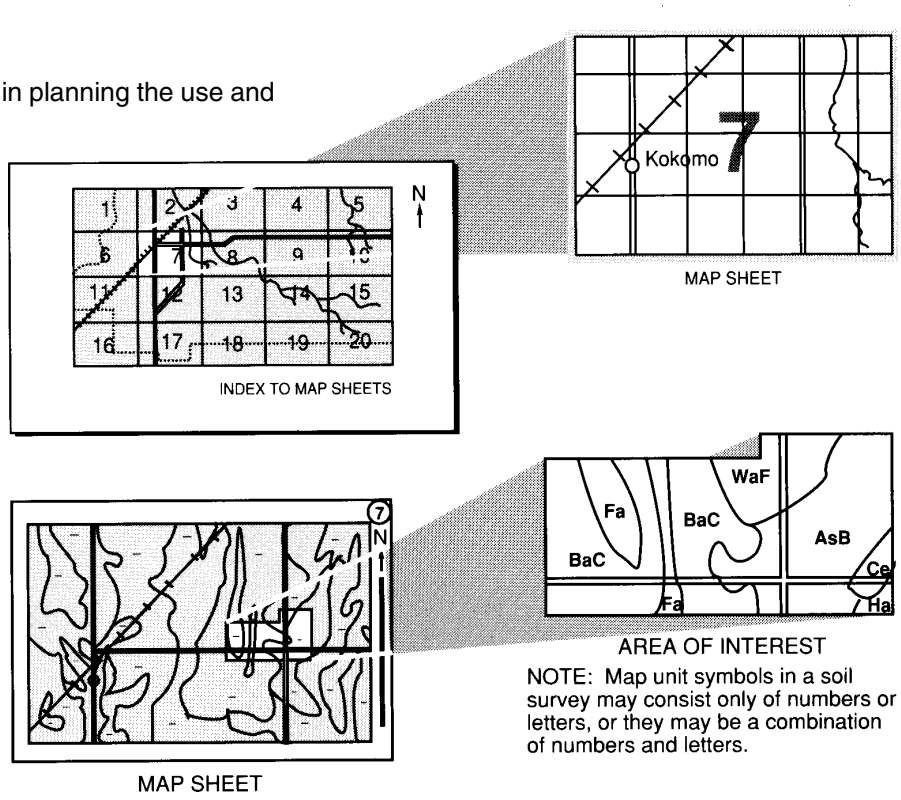
Detailed Soil Maps

The detailed soil maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**. Note the number of the map sheet and turn to that sheet.

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Contents**, which lists the map units by symbol and name and shows the page where each map unit is described.

The **Contents** shows which table has data on a specific land use for each detailed soil map unit. Also see the **Contents** for sections of this publication that may address your specific needs.



NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) leads the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1988. Soil names and descriptions were approved in 1991. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1988. This survey was made cooperatively by the Natural Resources Conservation Service, the Tennessee Agricultural Experiment Station, the Jefferson County Board of Commissioners, and the Tennessee Department of Agriculture. The survey is part of the technical assistance furnished to the Jefferson County Soil Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: Pasture and woodland are major land uses in Jefferson County. Dunmore and Fullerton soils are dominant on this landscape.

Additional information about the Nation's natural resources is available on the Natural Resources Conservation Service home page on the World Wide Web. The address is http://www.nrcs.usda.gov (click on "Technical Resources").

Contents

Issued 2000

Foreword

This soil survey contains information that affects land use planning in Jefferson County. It contains predictions of soil behavior for selected land uses. The survey also highlights soil limitations, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land users identify and reduce the effects of soil limitations that affect various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

James W. Ford
State Conservationist
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Soil Survey of
Jefferson County, Tennessee

By Clarence T. Conner, Natural Resources Conservation Service

Fieldwork by Clarence T. Conner, David E. McKinney, and Laurence A. Rochat, Natural Resources Conservation Service; and Jeffrey Cox and Stanley H. Crownover, Jefferson County Board of Commissioners and Tennessee Department of Agriculture

United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with
the Tennessee Agricultural Experiment Station, the Jefferson County Board of Commissioners, and the Tennessee Department of Agriculture

JEFFERSON COUNTY is in the northeastern part of Tennessee (fig. 1). It covers 314 square miles, or 200,900 acres. Its boundaries are the Holston River and Hamblen County on the north, the French Broad River and Cocke County on the east, Sevier County on the south, and Knox and Sevier Counties on the west.

The population of the county in 1986, according to the Chamber of Commerce, was 33,400. Dandridge, the county seat, is on the French Broad River, 30 miles east of Knoxville. Dandridge was named for Martha Dandridge Washington, wife of George Washington. Jefferson City, with a population of 6,000, is the largest town in the county. Other towns are New Market, Strawberry Plains, Talbott, White Pine, Piedmont, Oak Grove, Shady Grove, Chestnut Hill, Pleasant Hill, and Sandy Ridge.

Two large reservoirs are in the county. Cherokee Reservoir is an impoundment of the Holston River. It forms part of the northern boundary of the county. Douglas Reservoir is an impoundment of the French Broad River. It covers part of the southeast corner of the county and forms part of the eastern boundary.

The U.S. Department of Agriculture published the first soil survey of Jefferson County in 1941 (Moon 1941). The present survey updates the 1941 survey, provides a more detailed soil survey on aerial photography, and contains more interpretative information on the composition and uses of the soils.

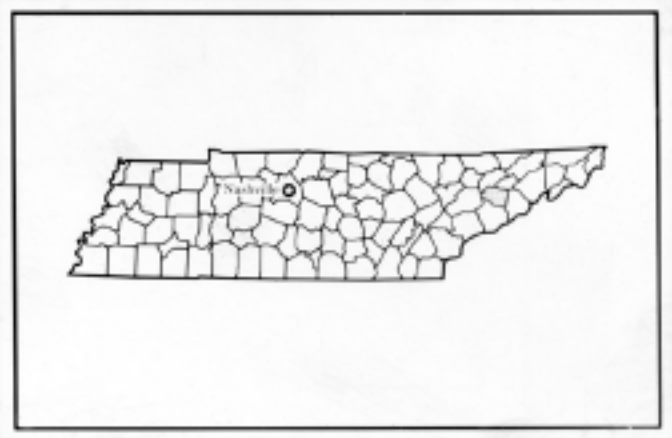

Figure 1.—Location of Jefferson County in Tennessee.

General Nature of the County

This section gives general information about the county. It describes history and development; resources and development; transportation; physiography, geology, relief, and drainage; and climate.

History and Development

The first permanent white settlers, largely from Virginia and North Carolina, arrived in what is now Jefferson County in 1782-83. Most were of

Scotch-Irish and English descent. Some of them had fought at the Battle of King's Mountain in the Revolutionary War and had passed through the survey area on their way home. They found fertile soil; easy transportation on the Holston, French Broad, and Nolichucky Rivers; temperate climate; and splendid mountains.

By 1792, the population of the survey area had increased so much that William Blount, Governor of the Territory South of the Ohio River, as Tennessee was then called, issued an ordinance forming Jefferson County from Hawkins and Greene Counties. Several settlers were prominent in organizing the ill-fated State of Franklin (1784-88). In 1793, they helped to organize Jefferson County, with Dandridge as the county seat.

The first schools were largely private or parochial. In 1806, Maury Academy opened in Dandridge with partial State funding. It was open to students from all over the county. Later, smaller schools were consolidated to improve curriculums. In 1987, the county had a large central high school and eight middle and elementary schools. It had a total attendance of 5,667 students and a staff of 327 principals, teachers, and assistants. Carson-Newman College, a private 4-year school, is located in Jefferson City.

The county courthouse in Dandridge has records dating back to 1792. Built in 1845-48 and expanded in the 1950's, it provides for the county's growing population and is part of the Dandridge Historic District. It also houses a county museum. Among the museum's collection are Davy Crockett's 1806 marriage license; numerous Indian and Civil War artifacts; an antique gun collection; and photographs, newspapers, and other Americana.

During the Civil War, several minor battles were fought in the county. The county's populace and churches were politically divided, but the majority supported the Union.

In 1987, the county ranked 36th in Tennessee with a population of about 35,000. Most employment is found in agriculture, mining, and manufacturing. Several industrial parks provide employment. Cherokee Dam on the Holston River and Douglas Dam on the French Broad River promote tourism. The dams were built by the Tennessee Valley Authority (TVA) in the early 1940's.

Resources and Development

Farming in Jefferson County consists of tobacco, beef or dairy cattle, and chicken or pork operations. Limestone bedrock supports two limestone plants. Carson-Newman College and a technical work force help to drive the economy. Two TVA lakes provide opportunities for public fishing and boating. Woodland in the greater county area supports 13 furniture and building material manufacturers. Several plants produce rock, sand, concrete, or asphalt for road and building construction. Zinc is produced at two zinc mines. Other industries include manufacturers of boats, garments, luggage, paper rolls and labels, signs, specialty machines and mill wright material, concrete mixing equipment, pickup and auto accessories, hydraulic hose, and power lines. The county also has a silver refinery, a cannery, and a chocolate factory.

Transportation

Jefferson County has excellent transportation facilities. A main branch of the Southern Railway System, Interstates 40 and 81, and U.S. Highways 11-E, 25-E, 25-W, and 70 cross the county.

For carrying farm produce to market, State highways link a network of good county roads to Dandridge and to neighboring counties and states. Most county roads are paved.

Physiography, Geology, Relief, and Drainage

Jefferson County is primarily in the Great Valley of East Tennessee, part of the Valley and Ridge province of the Appalachian Highlands. This area consists of alternating ridges and valleys. Long, parallel ridges separated by narrow valleys extend across the county in a northeast-southwest direction. A small part of the southeast corner of the county is in the Blue Ridge province of the Appalachian Highlands. This area consists of a small part of English Mountain, which is high and steep and has narrow, uneven tops and steep, rugged side slopes.

The geology of the county is complex. Great Valley bedrock consists of dolomite, shale, sandstone, and limestone with severe folding and faulting. These rocks range in age from Late Cambrian to Middle Ordovician. Blue Ridge bedrock consists mainly of sandstone and shale of Early Cambrian age.

Generally, slope and drainage both are northeast to southwest. Minor tributaries flow in a transverse direction toward the Holston and French Broad Rivers. These rivers unite just east of Knoxville, forming the Tennessee River.

Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at Jefferson City, Tennessee, in the period 1951 to 1984. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 38 degrees F and the average daily minimum temperature is 28 degrees. The lowest temperature on record, which occurred on January 24, 1963, is -11 degrees. In summer, the average temperature is 74 degrees and the average daily maximum temperature is 86 degrees. The highest recorded temperature, which occurred on September 2, 1953, is 103 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is about 46 inches. Of this, about 22 inches, or 45 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 18 inches. The heaviest 1-day rainfall during the period of record was 3.93 inches on December 10, 1972. Thunderstorms occur on about 47 days each year, and most occur in summer.

The average seasonal snowfall is about 7 inches. The greatest snow depth at any one time during the period of record was 16 inches. On average, 1 day of the year has at least 1 inch of snow on the ground.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 85 percent. The sun shines 60 percent of the time possible in summer and 45 percent in winter. The prevailing wind is from the northeast. Average wind speed is highest, 9 miles per hour, in spring.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same

taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

The descriptions, names, and delineations of the soils in this survey area do not fully agree with those of the soils in adjacent survey areas. Differences are the result of a better knowledge of soils, modifications in series concepts, or variations in the intensity of mapping or in the extent of the soils in the survey areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils or miscellaneous areas and some minor soils or miscellaneous areas. It is named for the major soils or miscellaneous areas. The components of one map unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

1. Dandridge-Sequoia

Gently sloping to very steep, shallow and moderately deep, excessively drained and well drained soils that have a clayey subsoil; on uplands

This map unit is characterized by highly dissected hillsides and narrow, winding ridgetops (fig. 2). It makes up about 20 percent of the county. It is about 65 percent Dandridge soils, 17 percent Sequoia soils, and 18 percent soils of minor extent.

The sloping to very steep Dandridge soils are on hillsides and narrow ridgetops. They are shallow and excessively drained. They have many shale fragments throughout and are underlain by calcareous shale.

The gently sloping to moderately steep Sequoia soils are on the broader, rounded ridgetops and the upper part of hillsides. They are moderately deep and well drained. These soils are underlain by acid shale.

Of minor extent in this map unit are Muse soils on foot slopes, areas of gullied land on hillsides, and Whitesburg soils in narrow drainageways.

About 30 percent of this unit is cleared, and the rest is mixed hardwood forest intermingled with pines and cedars. A few cultivated areas are on the broader ridgetops and on narrow flood plains. Tobacco and vegetables are the main row crops. Pasture is a common use except on the steepest slopes. Most of this unit is suited to pasture and trees. Steepness of slope, the erosion hazard, root zone depth, and droughtiness are the most serious management problems.

These soils are poorly suited to urban uses because of slope, moderately slow permeability, and depth to bedrock.

2. Dewey-Etowah

Gently sloping to moderately steep, very deep, well drained soils that have a clayey and loamy subsoil; on uplands and intermediate terraces

This map unit is characterized by broad, gently sloping ridgetops and smooth, sloping to moderately steep hillsides. Sinkholes and depressions are common in this unit.

This map unit makes up about 9 percent of the county. It is about 46 percent Dewey soils, 30 percent Etowah soils, and 24 percent soils of minor extent.

Dewey soils are on ridgetops and hillsides. They have a clayey subsoil.

Etowah soils are on foot slopes and in depressions. They have a loamy subsoil.

Of minor extent in this map unit are Dunmore and Decatur soils on uplands, Emory soils in depressions, and Nolin and Lindside soils in drainageways.

Most of this unit is farmed. It is the best agricultural area in the county. On a large acreage of this unit, corn and small grain are grown for silage. The remainder of the farmland is used for pasture, hay, tobacco, or

Figure 2.—Typical landscape in the Dandridge-Sequoia general soil map unit.

vegetable crops. Dairy farming is the main agricultural enterprise. Slope and the erosion hazard are the most significant management problems.

This unit is well suited to most urban uses but is used mainly for farming. Urbanization is expanding along the U.S. Highway 11-W corridor.

3. Dunmore-Fullerton-Dewey

Gently sloping to steep, very deep, well drained soils with a clayey subsoil; on uplands

This map unit consists of high, rounded hills that are dissected by numerous meandering drainageways and sinkholes. It is the most extensive unit in the county.

This map unit makes up about 45 percent of the county. It is about 50 percent Dunmore soils, 22 percent Fullerton soils, 10 percent Dewey soils, and 18 percent soils of minor extent.

Dunmore and Dewey soils are on the broadest, rolling ridgetops and side slopes. They contain less than 15 percent chert fragments throughout.

Fullerton soils are on the highest ridgetops and steep side slopes. They contain more than 15 percent chert fragments throughout.

Of minor extent in this map unit are Etowah soils on foot slopes and Emory and Nolin soils in depressions, sinkholes, and narrow drainageways. Lindside soils are in wider drainageways and on narrow flood plains.

Most of this unit is cleared and farmed. Beef cattle production is the main farm enterprise, but there are a

few dairy farms. The main crops are hay and pasture. Some corn and wheat are grown for silage on the dairy farms. Tobacco, fruits, and vegetables are important cash crops. Slope and the erosion hazard are the most significant management problems. Trees are productive on this unit, and the steeper side slopes are wooded.

These soils are moderately suited or poorly suited to urban uses. Steepness of slope is a limitation for most uses. The underlying cavernous limestone is a limitation or hazard for most urban uses. Some areas are subject to slides when cuts are made across the base of long, steep slopes. Investigations should be made before sites for structures and other facilities are selected.

4. Talbott-Rock Outcrop

Sloping to steep, moderately deep, well drained soils with a clayey subsoil and numerous outcrops of limestone bedrock; on uplands

This map unit is characterized by low-lying hills that have short, steep side slopes and rolling ridgetops. Limestone bedrock outcrops as ledges and bands that are generally parallel to the slope. Sinkholes and depressions are common on this unit.

This map unit makes up about 3 percent of the county. It is about 55 percent Talbott soils, 25 percent Rock outcrop, and 20 percent soils of minor extent.

Talbott are the only major soils in this unit. Outcrops of limestone are scattered throughout the unit. Some of the outcrops extend 2 to 3 feet above the surface.

Of minor extent in this map unit are Etowah soils on foot slopes, Emory soils in sinkholes and depressions, and Collegedale soils on uplands.

About 40 percent of this unit is cleared. Most of the cleared acreage is used for pasture. The unit is poorly suited to row crops because of the many rock ledges and outcrops. A few of the larger sinkholes and depressions are used for tobacco and vegetables. Steepness of slope, numerous rock outcrops, and droughtiness are the most serious management problems.

This unit is poorly suited to urban uses because of numerous rock outcrops, depth to rock, slope, and moderately slow permeability.

5. Collegedale-Armuchee-Talbott-Rock Outcrop

Gently sloping to steep, very deep and moderately deep, well drained soils that have a clayey subsoil and numerous outcrops of limestone; on uplands

This map unit consists of low, rounded hills that have bands of rock outcrop in the valleys and forest on the steep ridges. Sinkholes and depressions are common in the valleys.

This map unit makes up about 14 percent of the county. It is about 37 percent Collegedale soils, 27 percent Armuchee soils, 12 percent Talbott soils, 12 percent Rock outcrop, and 12 percent soils of minor extent.

Collegedale soils are on ridgetops and side slopes and are very deep. Outcrops of limestone bedrock are associated with these soils.

Armuchee soils are on the highest ridges. They are moderately deep over shale bedrock.

Talbott soils are on low hills and in valleys. They are moderately deep over limestone bedrock and have numerous outcrops of limestone bedrock.

Rock outcrop is associated with the Collegedale and Talbott soils. The outcrops commonly occur as ledges and bands and extend from a few inches to about 3 feet above the surface.

Of minor extent in this map unit are the somewhat poorly drained Newark and Beason soils and the moderately well drained Lindside soils on flood plains and low terraces. Also of minor extent are Muse soils on foot slopes and Montevallo and Muskingum soils on uplands.

About 70 percent of this unit is cleared. Some acres are idle and are reverting to woodland. Most of the cleared areas are used for pasture or hay. These soils are best suited to pasture and hay, which are the best uses for this unit. This unit is poorly suited to row crops because of rock outcrops, steepness of slope, depth of the root zone, and droughtiness. The steepest areas and those with the most rock outcrops are in woodland, which is their best use.

This unit is poorly suited to urban uses because of depth to bedrock, rockiness, moderately slow and slow permeability, and steepness of slope.

6. Nolichucky-Swafford-Purdy

Nearly level to moderately steep, very deep, well drained to poorly drained soils with a loamy and clayey subsoil; on high and low terraces and in upland depressions

This map unit consists of broad, nearly level and gently sloping, low terraces and gently sloping to moderately steep, high terraces.

This map unit makes up about 6 percent of the county. It is about 50 percent Nolichucky soils, 20 percent Swafford soils, 12 percent Purdy soils, and 18 percent soils of minor extent.

The gently sloping to moderately steep Nolichucky soils are on high terraces. They are very deep and well drained. They have a loamy subsoil.

The gently sloping Swafford soils are on broad terraces. They are very deep and moderately well drained. They have a loamy subsoil.

The nearly level Purdy soils are on low terraces. They are very deep and poorly drained and have a clayey subsoil.

Of minor extent in this map unit are the somewhat poorly drained Beason soils on nearly level, low terraces, the well drained Sequoia soils on shale knobs, and Ramsey and Gilpin soils on the steep side slopes of high knobs.

About 65 percent of the acreage in this unit is cleared. The wooded areas are mostly cutover oak and hickory intermingled with pine and redcedar. Several of the shale knobs that were cleared are reverting to eastern redcedar and pine. Most of this unit is used for growing hay and pasture for beef cattle operations. There are a few dairies, mostly along the Holston River. Growing vegetables for market is important near White Pine. Tobacco is grown throughout this unit. The nearly level and gently sloping terraces are well suited to row crops, but care should be taken to minimize erosion. Rotations with hay crops, minimum tillage, and stripcropping are suitable erosion-control measures. The steeper hills and shale knobs are moderately suited to pasture and hay, but production is limited by droughtiness. The erosion hazard, droughtiness, and steepness of slope are the most serious management problems.

Most of the soils on the low terraces are poorly suited to urban uses because of wetness, slow permeability, the seasonal high water table, and rare flooding on the Purdy and Swafford soils. The more nearly level Nolichucky soils are well suited to most urban uses, but the steeper areas of these soils are limited by the slope.

7. Allen-Bouldin

Sloping to very steep, very deep, well drained soils that have a loamy subsoil; on sides of mountains, benches, and foot slopes

This map unit is characterized by steep, dissected slopes of English Mountain and the foot slopes at the base of the mountain. English Mountain's crest is 3,500 feet in elevation, and Chestnut Hill, at the bottom of the foot slopes, is 1,300 feet in elevation.

This map unit makes up about 3 percent of the county. It is about 61 percent Allen soils, 21 percent Bouldin soils, and 18 percent soils of minor extent.

The sloping to steep Allen soils are on mountainsides, benches, and foot slopes.

The moderately steep to very steep Bouldin soils are on concave mountain slopes and in ravines and drainageways of English Mountain. They have a large number of cobbles, stones, and boulders on the surface and throughout the soil profile.

Of minor extent in this map unit are Dunmore, Dewey, and Waynesboro soils on the hills at the foot of the mountain and Ennis soils in drainageways.

Most of this unit is mixed hardwood forest with some scattered pines. Some of the foot slopes and adjacent hills have been cleared and are farmed. Most of the farms are small, averaging less than 100 acres in size. The cleared areas are used for pasture, hay, tobacco, or vegetable crops. The erosion hazard and steepness of slope are the most serious management problems on cultivated land. Conservation practices, such as stripcropping, crop rotations, and conservation tillage, are needed to prevent excessive soil loss.

The mountain part of this unit is poorly suited to urban uses because of steepness of slope and the high content of stones on the surface and throughout the soils. The Allen soils on foot slopes are moderately suited or poorly suited to urban uses because of slope. These soils are subject to slides if cuts are made near the base of long slopes.

Detailed Soil Map Units

The map units delineated on the detailed maps at the back of this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses. More information about each map unit is given under the heading "Use and Management of the Soils."

A map unit delineation on a map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils or miscellaneous areas. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils and miscellaneous areas are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some "included" areas that belong to other taxonomic classes.

Most included soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, inclusions. They may or may not be mentioned in the map unit description. Other included soils and miscellaneous areas, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, inclusions. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The included areas of contrasting soils or miscellaneous areas are mentioned in the map unit descriptions. A few included areas may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of included areas in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans, but if intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Fullerton gravelly silt loam, 5 to 12 percent slopes, eroded, is a phase of the Fullerton series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Montevallo-Armuchee complex, 15 to 50 percent slopes, gullied, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Dunmore and Fullerton soils, karst, 10 to 30 percent slopes, eroded, is an undifferentiated group in this survey area.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. The map unit Dumps, mine, is an example.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

AeC—Arents, clayey, 2 to 12 percent slopes

This map unit consists of clayey soils that were cut and filled and partially reshaped during the construction of Cherokee Dam. It is mainly in areas near the dam but is also in a few small areas near urban developments in other parts of the county. The original soils were mostly Fullerton, Dunmore, and Collegedale soils. Individual areas of the unit range from about 5 to 100 acres in size.

Most of this map unit is used for a specific purpose. The suitability of an individual area for an alternative use must be determined by onsite investigation. If good management practices are applied, a cover of grasses and trees can be maintained.

This map unit has not been assigned a land capability classification.

AnC2—Allen sandy loam, 5 to 12 percent slopes, eroded

This is a sloping, very deep, well drained soil mainly on benches, foot slopes, and lower side slopes of English Mountain. It formed in residuum and colluvium derived from sandstone and shale. Individual areas of this soil range from 5 to 50 acres in size.

In a typical area the surface layer of this soil is brown sandy loam about 6 inches thick. In the upper part the subsoil is yellowish brown sandy loam and yellowish red sandy clay loam. In the lower part, to a depth of 65 inches, it is red clay loam that has strong brown mottles.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Permeability is moderate. Available water capacity is high. Depth to bedrock is more than 60 inches.

Included with this Allen soil in mapping are small areas of Dunmore and Waynesboro soils, which have a clayey subsoil. Also included are small areas of Bouldin soils, which have stones on the surface and have more than 35 percent rock fragments in the subsoil.

This soil is used mostly for cropland, hay, and pasture. It is well suited to hay and pasture and moderately suited to row crops. This soil is suited to all adapted crops, grasses, and legumes. Erosion is a hazard if cultivated crops are grown. Combined conservation practices help to reduce runoff, to control erosion, to conserve moisture, and to maintain tilth.

This soil is well suited to woodland. Yellow poplar, shortleaf pine, and loblolly pine are suited. Plant competition is the main management concern. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is well suited to most urban uses. Slope is the main limitation. Designing structures and facilities to fit the landscape helps to overcome slope.

This soil is in land capability subclass IIIe.

AnD2—Allen sandy loam, 12 to 20 percent slopes, eroded

This is a moderately steep, very deep, well drained soil mostly on benches, foot slopes, and lower side slopes of English Mountain. It formed in residuum and colluvium derived from sandstone and shale. Individual areas range from 5 to 50 acres in size.

In a typical area the surface layer of this soil is brown sandy loam about 6 inches thick. In the upper part the subsoil is yellowish brown sandy loam and

yellowish red sandy clay loam. In the lower part, to a depth of 65 inches, it is red clay loam that has strong brown mottles.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Permeability is moderate. Available water capacity is high. Depth to bedrock is more than 60 inches.

Included with this Allen soil in mapping are areas of Bouldin, Dunmore, and Waynesboro soils. Dunmore and Waynesboro soils are clayey in the subsoil. Bouldin soils have stones on the surface. They also have more than 35 percent rock fragments throughout the subsoil.

This soil is used mostly for hay and pasture. It is moderately suited to hay and pasture and poorly suited to row crops. It is suited to all adapted crops, grasses, and legumes. Erosion is a severe hazard if cultivated crops are grown. Combined conservation practices help to reduce runoff, to control erosion, to conserve moisture, and to maintain tilth.

This soil is well suited to woodland. Yellow poplar, shortleaf pine, and loblolly pine are suited to planting. Because of slope, erosion is a hazard during harvesting and reforestation. Slope makes use of equipment more hazardous. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is moderately suited to most urban uses. Slope is the main limitation. In most areas designing structures and facilities to fit the landscape helps to overcome slope.

This soil is in land capability subclass IVe.

AnE—Allen sandy loam, 20 to 40 percent slopes

This is a steep, very deep, well drained soil mostly on side slopes and in coves of English and Bays Mountains. It formed in residuum and colluvium derived from sandstone and shale. Individual areas of this soil range from 5 to 100 acres in size.

In a typical area the surface layer of this soil is brown sandy loam about 6 inches thick. In the upper part the subsoil is yellowish brown sandy loam and yellowish red sandy clay loam. In the lower part, to a depth of 65 inches, it is red clay loam that has strong brown mottles.

This soil is strongly acid or very strongly acid, but the surface layer is less acid where limed. Permeability is moderate. Available water capacity is high. Depth to bedrock is more than 60 inches.

Included with this Allen soil in mapping are areas of Bouldin, Dunmore, and Waynesboro soils. Dunmore and Waynesboro soils are clayey in the subsoil. Bouldin soils have stones on the surface and more than 35 percent rock fragments throughout the subsoil.

This soil is used mostly as woodland. In a few areas it is used for pasture. It is poorly suited to hay and pasture and unsuited to row crops. Good pasture management is needed to control erosion and to maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

This soil is moderately suited to woodland. Yellow poplar, shortleaf pine, and loblolly pine are suited to planting. Because of slope, erosion is a hazard during harvesting and reforestation. Steep slopes make use of equipment more hazardous or limit the usefulness of certain types of equipment.

This soil is poorly suited to most urban uses because of steep slopes. It can be used for some structures and facilities designed to fit the landscape. Landslides are a hazard if cuts are made in long slopes or at the base of short slopes.

This soil is in land capability subclass VIIe.

ArD2—Armuchee channery silt loam, 10 to 25 percent slopes, eroded

This is a moderately steep, moderately deep, well drained soil on side slopes and tops of shale ridges. It formed in residuum derived from shale. Individual areas range from 5 to 100 acres in size.

In a typical area the surface layer of this soil is dark grayish brown channery silt loam about 4 inches thick. The subsoil, to a depth of 18 inches, is brown channery silt loam and strong brown channery silty clay. The substratum is strong brown very channery silty clay. Weathered shale is at a depth of 24 inches.

This soil is strongly acid or very strongly acid. Available water capacity is low. Permeability is moderately slow. Depth to bedrock ranges from 20 to 40 inches.

Included with this Armuchee soil in mapping are a few small areas of Gilpin, Montevallo, and Sequoia soils. Gilpin soils have a thicker subsoil than the Armuchee soil and are loamy in the subsoil. Sequoia soils have a thicker subsoil and a slightly deeper root zone than the Armuchee soil. Montevallo soils are less than 20 inches deep over weathered shale. In a few places narrow bands of limestone outcrops are included.

This soil is used mostly for hay and pasture. It is poorly suited to row crops and hay. It is moderately suited to pasture. The main soil problems are slope, the erosion hazard, low available water capacity, and depth of the root zone. Good pasture management is needed to control erosion and to maintain productivity.

It includes fertilization, weed control, and avoidance of overgrazing.

This soil is moderately suited to woodland. Trees suited to planting include loblolly pine and Virginia pine. Low available water capacity and depth of the root zone limit productivity. Because of slope, erosion is a hazard during harvesting and reforestation. Moderately steep slopes make use of equipment more hazardous.

This soil is poorly suited to most urban uses because of moderately steep slopes, depth to bedrock, and moderately slow permeability. Overcoming these limitations through designing and building structures and facilities that function properly would be expensive.

This soil is in land capability subclass VIe.

ArE3—Armuchee channery silty clay loam, 15 to 45 percent slopes, severely eroded

This is a moderately steep and steep, moderately deep, well drained soil on the sides of shale ridges. It formed in residuum derived from acid shale. Individual areas of this soil range from 5 to 90 acres in size.

In a typical area the surface layer of this soil is strong brown channery silty clay loam about 6 inches thick. The surface layer consists mainly of material from the subsoil because the original surface layer has been removed by erosion. The subsoil, to a depth of 18 inches, is strong brown channery silty clay. The substratum is strong brown very channery silty clay. Weathered shale is at a depth of 20 inches.

This soil is strongly acid or very strongly acid. Available water capacity is low. Permeability is moderately slow. Depth to bedrock ranges from 20 to 40 inches.

Included with this Armuchee soil in mapping are a few small areas of Dandridge, Gilpin, and Sequoia soils. Dandridge soils are less than 20 inches deep over weathered shale. Gilpin soils have a thicker subsoil than that of the Armuchee soil and are loamy in the subsoil. Sequoia soils have a thicker subsoil and a slightly deeper root zone than the Armuchee soil.

In most areas this soil is used as woodland. In a few areas it is used for pasture. Southern red oak, hickory, Virginia pine, and shortleaf pine are suited to planting. The soil is poorly suited to woodland because of steep slopes, low available water capacity, and depth of the root zone. Because of slope, erosion is a hazard during harvesting and reforestation. Steep slopes make the use of equipment more hazardous or limit the usefulness of certain types of equipment.

This soil is poorly suited to pasture and is not suited to hay or cultivated crops. The main limitations are steep slopes, low available water capacity, and depth of the root zone.

This soil is poorly suited to most urban uses because of steep slopes, depth to bedrock, and moderately slow permeability. Overcoming the limitations through designing and building structures and facilities that function properly would be expensive.

This soil is in land capability subclass VIIe.

ArF2—Armuchee channery silt loam, 25 to 60 percent slopes, eroded

This is a steep and very steep, moderately deep, well drained soil on the sides of shale ridges throughout the county. It formed in residuum derived from acid shale. Individual areas of this soil range from 5 to 100 acres in size.

In a typical area the surface layer of this soil is dark grayish brown channery silt loam about 4 inches thick. The subsoil, to a depth of 18 inches, is brown channery silt loam and strong brown channery silty clay. The substratum is strong brown very channery silty clay. Weathered shale is at a depth of 24 inches.

This soil is strongly acid or very strongly acid. Available water capacity is low. Permeability is moderately slow. Depth to bedrock ranges from 20 to 40 inches.

Included with this Armuchee soil in mapping are a few small areas of Dandridge, Gilpin, and Sequoia soils. Dandridge soils are less than 20 inches deep over weathered shale. Gilpin soils have a thicker subsoil than that of the Armuchee soil and are loamy in the subsoil. Sequoia soils have a thicker subsoil and a slightly deeper root zone than the Armuchee soil.

This soil is used almost entirely as woodland. Southern red oak, hickory, Virginia pine, and shortleaf pine are suited to planting. The soil is poorly suited to woodland because of steep slopes, low available water capacity, and depth of the root zone. Because of slope, erosion is a hazard during harvesting and reforestation. Steep slopes make the use of equipment more hazardous or limit the usefulness of certain types of equipment.

This soil is poorly suited to pasture and is not suited to hay or crops because of steep slopes, low available water capacity, and depth of the root zone.

This soil is poorly suited to most urban uses because of steep slopes, depth to bedrock, and moderately slow permeability. Overcoming the limitations through designing and building structures

and facilities that function properly would be expensive.

This soil is in land capability subclass VIIe.

Be—Beason silt loam, occasionally flooded

This is a deep, nearly level, somewhat poorly drained soil on low terraces and toe slopes. It formed in alluvium. Individual areas of this soil are 5 to 40 acres. Slopes range from 0 to 2 percent.

In a typical area the surface layer of this soil is brown silt loam about 9 inches thick. The subsoil extends to a depth of 46 inches. In the upper part it is brown silt loam that has grayish brown mottles. In the middle part it is light olive brown and yellowish brown silty clay loam that has light gray mottles. In the lower part it is silty clay and silty clay loam mottled in shades of brown and gray. The substratum to a depth of 60 inches is clay loam mottled in shades of brown and gray.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Permeability is moderately slow. Available water capacity is high. Depth to bedrock is more than 60 inches. In most years the seasonal high water table is at a depth of 1 to 2 feet from December through April. This soil is subject to occasional flooding of very brief duration.

Included with this Beason soil in mapping are a few small areas of Newark and Purdy soils. Newark soils are on slightly lower bottom lands. Purdy soils are in positions similar to those of the Beason soil but are poorly drained. Also included are a few areas of soils that are similar to the Beason soil but that are moderately well drained.

This soil is used mainly for pasture and hay. In some areas it is used for row crops. It is well suited to hay and pasture if such water-tolerant grasses and legumes as tall fescue and ladino clover are used. It is only moderately suited to row crops because of wetness. Water-sensitive crops such as tobacco are poorly suited.

This soil is well suited to woodland. Trees suited to planting include yellow poplar, sweetgum, and loblolly pine. Harvesting is confined to summer and fall, when the soil is not saturated. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is not suited to most urban uses because of flooding and a high water table. Drainage and flood prevention measures are needed to overcome these limitations, but in most areas they are not feasible.

This soil is in land capability subclass IIw.

BoD—Bouldin cobbly sandy loam, 12 to 25 percent slopes, very stony

This is a moderately steep, very deep, well drained soil on the lower slopes of mountains and on benches. It formed in colluvium derived from sandstone and shale. Stones and boulders on the surface vary in number from area to area. The largest number of them is in concave areas along drainageways and on benches. Individual areas of this soil are 5 to 75 acres.

In a typical area the surface layer of this soil is very dark grayish brown cobbly sandy loam about 2 inches thick (fig. 3). The subsurface layer is strong brown cobbly sandy loam 7 inches thick. In the upper part the subsoil is red very cobbly and extremely cobbly clay loam. In the lower part it is red extremely stony clay loam.

This soil is strongly acid or very strongly acid throughout. Available water capacity is moderate. Permeability is moderately rapid. Depth to bedrock is more than 60 inches.

Included with this Bouldin soil in mapping are a few areas of Allen and Waynesboro soils. Allen soils have less than 35 percent rock fragments in the subsoil. Waynesboro soils have fewer fragments than the Bouldin soil and are clayey in the subsoil.

In almost every area this soil is used as woodland. It is well suited to this use. Yellow poplar, northern red oak, shortleaf pine, and white oak are suited to planting. Because of slope, erosion is a hazard during harvesting and reforestation. Moderately steep slopes make the use of equipment more hazardous. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is poorly suited to farming and urban uses because of high stone content, slope, and stones and boulders on the surface. Landslides are a hazard if cuts are made in long slopes or at the base of short slopes.

This soil is in land capability subclass VIIs.

BoF—Bouldin cobbly sandy loam, 25 to 70 percent slopes, very stony

This is a steep and very steep, very deep, well drained soil on the sides of mountains and on benches. It formed in colluvium derived from sandstone and shale. Stones and boulders on the surface vary in number. The largest number of them is in concave areas along drainageways and on benches. Individual areas of this soil are 5 to 100 acres.

Figure 3.—An area of Bouldin cobbly sandy loam, 12 to 25 percent slopes, very stony. This soil has cobbles and stones throughout the profile. In most areas it is used for woodland. It is well suited to woodland.

In a typical area the surface layer of this soil is very dark grayish brown cobbly sandy loam about 2 inches thick. The subsurface layer is strong brown cobbly sandy loam 7 inches thick. In the upper part the subsoil is red very cobbly and extremely cobbly clay loam. In the lower part it is red extremely stony clay loam.

This soil is strongly acid or very strongly acid throughout. Available water capacity is moderate. Permeability is moderately rapid. Depth to bedrock is more than 60 inches.

Included with this Bouldin soil in mapping are a few areas of Allen, Gilpin, and Waynesboro soils. Allen soils have less than 35 percent rock fragments in the subsoil. Gilpin soils are less than 40 inches deep over shale. Waynesboro soils have fewer rock fragments than the Bouldin soil and are clayey in the subsoil.

In almost every area this soil is used as woodland. It is moderately suited to this use. Yellow poplar, northern red oak, shortleaf pine, and white oak are suited to planting. Because of slope, erosion is a hazard during harvesting and reforestation. Steep and very steep slopes make the use of equipment more hazardous and limit the usefulness of certain types of equipment. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is poorly suited to farming and urban uses because of high stone content, slope, and stones and

boulders on the surface. This soil is very susceptible to landslides if cuts are made in the long slopes.

This soil is in land capability subclass VIIs.

CoB2—Collegedale silt loam, 2 to 5 percent slopes, eroded

This is a gently sloping, very deep, well drained soil on low uplands. It formed in residuum derived from limestone. Individual areas of this soil are 5 to 40 acres.

In a typical area the surface layer of this soil is brown silt loam about 5 inches thick. The subsoil extends to a depth of 65 inches. In the upper few inches it is strong brown silty clay loam. Below that it is yellowish red silty clay and clay that has mottles in shades of yellow, red, and brown.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Permeability is moderately slow. Available water capacity is moderate or high. Depth to bedrock is more than 60 inches.

Included with this Collegedale soil in mapping are areas of similar soils that are less than 60 inches deep to bedrock and a few areas of rock outcrop. Also included are small areas of Dunmore, Fullerton, and Talbott soils.

In most areas this soil is used for cropland, hay, or pasture. It is well suited to hay and pasture and moderately suited to row crops. The clayey subsoil slows the movement of water and impedes the growth of roots. Erosion is a severe hazard if cultivated crops are grown. Combined conservation practices help to reduce runoff, to control erosion, to conserve moisture, and to maintain tilth.

This soil is well suited to woodland. Yellow poplar, southern red oak, white oak, shortleaf pine, Virginia pine, and loblolly pine are suited to planting. The clayey subsoil has low strength and is a moderate limitation for equipment during wet periods. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

The soil is moderately suited to some urban uses. It is poorly suited to septic tank absorption fields because of moderately slow permeability. For roads, adding rock to the subgrade is needed because of low strength. Foundations for buildings need to be designed to overcome the shrinking and swelling that occurs during wetting and drying of the soil.

This soil is in land capability subclass IIIe.

CoC2—Collegedale silt loam, 5 to 12 percent slopes, eroded

This is a sloping, very deep, well drained soil on uplands. It formed in residuum derived from limestone. Individual areas are 5 to 40 acres in size.

In a typical area the surface layer of this soil is brown silt loam about 5 inches thick. The subsoil extends to a depth of 65 inches. In the upper few inches it is strong brown silty clay loam. Below that it is yellowish red silty clay and clay that has mottles in shades of yellow, red, and brown.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Permeability is moderately slow. Available water capacity is moderate or high. Depth to bedrock is more than 60 inches.

Included with this Collegedale soil in mapping are areas of Talbott soils, which are less than 40 inches deep over bedrock. Also included are a few areas of soils that are less than 20 inches deep over bedrock and small areas of limestone outcrops. Also included are areas of soils that are similar to the Collegedale soil but that have a cherty surface layer.

This soil is used mostly for pasture, hay, and small grain. It is moderately suited to these uses and is poorly suited to row crops. The clayey subsoil slows the movement of water and impedes the growth of roots. Erosion is a severe hazard if cultivated crops are grown. Combined conservation practices help to reduce runoff, to control erosion, to conserve moisture, and to maintain tilth.

This soil is well suited to woodland. Yellow poplar, southern red oak, white oak, shortleaf pine, Virginia pine, and loblolly pine are suited. The clayey subsoil has low strength and is a moderate limitation to use of equipment during wet periods. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

The soil is moderately suited to some urban uses. It is poorly suited to septic tank absorption fields because of the moderately slow permeability. For roads, adding rock to the subgrade is needed because of low strength. Foundations for buildings need to be designed to overcome shrinking and swelling during wetting and drying of the soil.

This soil is in land capability subclass IVe.

CoC3—Collegedale silty clay loam, 5 to 15 percent slopes, severely eroded

This is a sloping, very deep, well drained soil on uplands. It formed in residuum derived from limestone. Individual areas of this soil are 5 to 40 acres.

In a typical area the surface layer of this soil is strong brown silty clay loam about 5 inches thick. The surface layer consists mainly of material from the subsoil because the original surface layer has been removed by erosion. The subsoil extends to a depth of 65 inches. It is yellowish red silty clay and clay with mottles in shades of yellow, red, and brown.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Permeability is moderately slow. Available water capacity is moderate. Depth to bedrock is more than 60 inches.

Included with this Collegedale soil in mapping are areas of Talbott soils, which are less than 40 inches deep over bedrock. Also included are a few areas of soils that are less than 20 inches deep over bedrock and small areas of limestone outcrops. Also included are a few areas of Dunmore and Fullerton soils.

In most areas this soil is used for pasture. It is moderately suited to pasture, poorly suited to hay, and in most areas not suited to row crops. The main limitations are slope, the erosion hazard, available water capacity, poor tilth, and moderately slow permeability. Good pasture management is needed to control erosion and to maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

This soil is moderately suited to woodland. Trees suited to planting include loblolly pine, shortleaf pine, and Virginia pine. The low strength in the clayey subsoil is a moderate limitation for equipment during wet periods. Seedling survival is a moderate problem because of a moisture deficiency. The problem is worse on south- and west-facing slopes, which are warmer and drier. Increasing the planting rate helps to obtain an adequate stand. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

The soil is moderately suited to some urban uses. It is poorly suited to septic tank absorption fields because of the moderately slow permeability. For roads, adding rock to the subgrade is needed because of low strength. Foundations for buildings need to be designed to overcome shrinking and swelling during wetting and drying of the soil.

This soil is in land capability subclass VIe.

CoD2—Collegedale silt loam, 12 to 20 percent slopes, eroded

This is a moderately steep, very deep, well drained soil on uplands. It formed in residuum derived from limestone. Individual areas of this soil are 5 to 40 acres.

In a typical area the surface layer of this soil is brown silt loam about 5 inches thick. The subsoil extends to a depth of 65 inches. In the upper few inches it is strong brown silty clay loam. Below that it is yellowish red silty clay and clay with mottles in shades of yellow, red, and brown.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Permeability is moderately slow. Available water capacity is moderate or high. Depth to bedrock is more than 60 inches.

Included with this Collegedale soil in mapping are areas of Talbott soils, which are less than 40 inches deep to bedrock. Also included are a few areas of soils that are less than 20 inches deep to bedrock and small areas of limestone outcrops. Also included are areas of severely eroded Collegedale soils and areas of soils that are similar to the Collegedale soil but that have a cherty surface layer.

In most areas this soil is used for pasture. It is moderately suited to pasture, poorly suited to hay, and not suited to row crops. The clayey subsoil slows the movement of water and impedes the growth of roots. Good pasture management is needed to control erosion and to maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

This soil is moderately suited to woodland. Yellow poplar, southern red oak, white oak, shortleaf pine, Virginia pine, and loblolly pine are suited to planting. Because of slope, erosion is a hazard during harvesting and reforestation. Moderately steep slopes make the use of equipment more hazardous. During wet periods the low strength in the clayey subsoil is also a limitation for equipment. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is poorly suited to most urban uses because of slope, moderately slow permeability, and low strength. It can be used for home sites if sewers are available and if the foundations are properly designed. For roads, adding rock to the subgrade is needed because of low strength.

This soil is in land capability subclass VIe.

CtD2—Collegedale-Talbott-Rock outcrop complex, 5 to 20 percent slopes, eroded

This map unit consists of Collegedale and Talbott soils and Rock outcrop in areas so intermingled that the components could not be separated in mapping. These soils and Rock outcrop are sloping and moderately steep. They are on the tops and sides of hills and ridges. Individual areas of these soils and rock outcrops range from 5 to 200 acres in size.

The Collegedale soil makes up about 40 percent of each mapped area. In a typical area the surface layer of this soil is brown silt loam about 5 inches thick. The subsoil extends to a depth of 65 inches. In the upper few inches it is strong brown silty clay loam. Below that it is yellowish red silty clay and clay with mottles in shades of yellow, red, and brown.

This soil is strongly acid or very strongly acid but where limed the surface layer is less acid. Permeability is moderately slow. Available water capacity is moderate or high. Depth to bedrock is more than 60 inches.

The Talbott soil makes up about 30 percent of each mapped area. In a typical area the surface layer of this soil is dark brown silt loam about 4 inches thick. In the upper few inches the subsoil is yellowish red silty clay loam. Below that it is yellowish red and red clay. Limestone is at a depth of 32 inches.

This soil is slightly acid to strongly acid. Permeability is moderately slow. Available water capacity is low or moderate. Depth to bedrock ranges from 20 to 40 inches.

Rock outcrop makes up about 20 percent of each mapped area. It consists of limestone outcrops mostly in bands parallel to the slope. The outcrops protrude a few inches to about 3 feet above the surface.

Included with the Collegedale and Talbott soils and Rock outcrop in mapping are small areas of soils that are 40 to 60 inches deep over bedrock and areas of soils that are less than 20 inches deep over bedrock. Also included are some spots of severely eroded soils that have a reddish, clayey surface layer.

In most areas this map unit is used as woodland (fig. 4). In a few areas it is used as pasture. It is moderately suited to woodland. Southern red oak, white oak, shortleaf pine, Virginia pine, and eastern redcedar grow on the unit. Slope, rock outcrop, and the clayey subsoil limit the use of equipment. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This map unit is poorly suited to farming and urban uses because of numerous rock outcrops, depth to bedrock, moderately slow permeability, available water capacity, and low strength.

This map unit is in land capability subclass VIs.

CtE2—Collegedale-Talbott-Rock outcrop complex, 20 to 35 percent slopes, eroded

This map unit consists of Collegedale and Talbott soils and Rock outcrop in areas so intermingled that the components could not be separated in mapping. The Collegedale and Talbott soils and Rock outcrop are steep. They are mainly on the sides of hills and ridges. Individual areas of these soils and rock outcrops range from 5 to 200 acres in size.

The Collegedale soil makes up about 40 percent of each mapped area. In a typical area the surface layer is brown silt loam about 5 inches thick. The subsoil extends to a depth of 65 inches. In the upper few inches it is strong brown silty clay loam. Below that it is yellowish red silty clay and clay with mottles in shades of yellow, red, and brown.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Permeability is moderately slow. Available water capacity is moderate or high. Depth to bedrock is more than 60 inches.

The Talbott soil makes up about 30 percent of each mapped area. In a typical area the surface layer of this soil is dark brown silt loam about 4 inches thick. In the upper few inches the subsoil is yellowish red silty clay loam. Below that it is yellowish red and red clay. Limestone is at a depth of 32 inches.

This soil is slightly acid to strongly acid. Permeability is moderately slow. Available water capacity is low or moderate. Depth to bedrock ranges from 20 to 40 inches.

Rock outcrop makes up about 20 percent of each mapped area. It consists of limestone outcrops that occur mostly in bands parallel to the slope. The outcrops protrude a few inches to about 3 feet above the surface.

Included with the Collegedale and Talbott soils and Rock outcrop in mapping are small areas of soils that are 40 to 60 inches deep over bedrock and areas of soils that are less than 20 inches deep over bedrock. Also included are some spots of severely eroded soils that have a reddish, clayey surface layer.

This map unit is used almost entirely as woodland. It is moderately suited to woodland. Southern red oak, white oak, shortleaf pine, Virginia pine, and eastern redcedar grow on the unit. Slope, rock outcrop, and

Figure 4.—An area of Collegedale-Talbott-Rock outcrop complex, 5 to 20 percent slopes, eroded. In most areas this map unit is used for woodland.

the clayey subsoil limit the use of equipment. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This map unit is poorly suited to farming and urban uses because of slope, numerous rock outcrops, depth to bedrock, moderately slow permeability, available water capacity, and low strength.

This map unit is in land capability subclass VIIs.

DaC2—Dandridge channery silt loam, 5 to 12 percent slopes, eroded

This is a sloping, shallow, excessively drained soil on ridgetops of highly dissected uplands. This soil formed mostly in calcareous shale that has some thin beds of limestone. Areas of this soil range from 5 to 100 acres in size.

In a typical area the surface layer of this soil is brown channery silt loam about 3 inches thick. In the upper part the subsoil is yellowish brown very channery silty clay loam that has intermittent pockets of dark yellowish brown very channery silty clay. In the lower part it is light yellowish brown very channery silty clay loam. Soft, weathered, calcareous shale is between depths of 17 and 35 inches. Hard, calcareous shale is at a depth of 35 inches.

This soil is neutral to moderately alkaline. Available water capacity is very low. Permeability is moderately slow. Depth to bedrock is less than 20 inches.

Included with this Dandridge soil in mapping, on the broadest ridgetops, are a few small areas of soils that are deeper than 20 inches to soft shale. Also included are some spots of severely eroded soils and some rock outcrops.

This soil is used mostly as pasture and woodland.

It is poorly suited to hay and pasture. It is not suited to cropland because of the shallow root zone and the very low available water capacity. Good pasture management is needed to control erosion and to maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

This soil is moderately suited to woodland. Southern red oak, Virginia pine, and eastern redcedar are common on this soil. Seedling survival is a moderate problem because of a moisture deficiency. The problem is worse on south- and west-facing slopes, which are warmer and drier. Increasing the planting rate helps to obtain an adequate stand. Windthrow is a severe hazard because of the shallow root zone.

This soil is poorly suited to most urban uses because of the shallow depth to bedrock and the large amount of rock fragments in the soil.

This soil is in land capability subclass VIe.

DaD2—Dandridge channery silt loam, 12 to 25 percent slopes, eroded

This is a moderately steep, shallow, excessively drained soil. It is on ridgetops and the upper side slopes of highly dissected uplands. It formed mostly in calcareous shale that has some thin beds of limestone. Areas of this soil range from 5 to 100 acres in size.

In a typical area the surface layer of this soil is brown channery silt loam about 3 inches thick. In the upper part the subsoil is yellowish brown very channery silty clay loam that has pockets of dark yellowish brown very channery silty clay. In the lower part it is light yellowish brown very channery silty clay loam. Soft, weathered, calcareous shale is between depths of 17 and 35 inches. Hard, calcareous shale is at a depth of 35 inches.

This soil is neutral to moderately alkaline. Available water capacity is very low. Permeability is moderately slow. Depth to bedrock is less than 20 inches.

Included with this Dandridge soil in mapping, on the broadest ridgetops, are a few small areas of soils that are more than 20 inches deep to soft shale. Also included are some spots of severely eroded soils and some rock outcrops.

In most areas this soil is used as pasture or woodland. It is poorly suited to hay and pasture. It is not suited to cropland because of the shallow root zone and the very low available water capacity. Good pasture management is needed to control erosion and to maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

This soil is only moderately suited to woodland. Southern red oak, Virginia pine, and eastern redcedar are common on this soil. Seedling survival is a moderate problem on this soil because of a moisture deficiency. It is worse on south- and west-facing slopes, which are warmer and drier. Increasing the planting rate helps to obtain an adequate stand. Windthrow is a severe hazard because of the shallow root zone.

This soil is poorly suited to most urban uses because of slope, shallow depth to bedrock, and the large amount of rock fragments in the soil.

This soil is in land capability subclass VIe.

DaD3—Dandridge channery silty clay loam, 10 to 25 percent slopes, severely eroded

This is a moderately steep, shallow, excessively drained soil. It is on ridgetops and the upper side slopes of highly dissected uplands. It formed mostly in calcareous shale that has some thin beds of limestone. Areas of this soil range from 5 to 200 acres in size.

In a typical area the surface layer of this soil is yellowish brown channery silt loam about 5 inches thick. The surface layer consists mainly of material from the subsoil because the original surface layer has been removed by erosion. The subsoil is light yellowish brown very channery silty clay loam. Soft, weathered, calcareous shale is between depths of 10 and 25 inches. Hard, calcareous shale is at a depth of 25 inches.

This soil is neutral to moderately alkaline. Available water capacity is very low. Permeability is moderately slow. Depth to bedrock is less than 20 inches.

Included with this Dandridge soil in mapping are some areas of rock outcrops.

In most areas this soil is used mostly as woodland. In a few areas it is used as pasture. This soil is poorly suited to woodland because of the shallow or very shallow root zone and the very low available water capacity. Virginia pine and eastern redcedar are common on this soil. Seedling survival is a severe problem on this soil because of a moisture deficiency. It is worse on south- and west-facing slopes, which are warmer and drier. Increasing the planting rate helps to obtain an adequate stand. Windthrow is a severe hazard because of the shallow root zone.

This soil is poorly suited to hay and pasture. It is not suited to cropland because of the shallow or very shallow root zone and the very low available water capacity. Good pasture management helps to control

erosion and to maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

This soil is poorly suited to most urban uses because of slope, shallow depth to bedrock, and the large amount of rock fragments in the soil.

This soil is in land capability subclass VIIe.

DaE3—Dandridge channery silty clay loam, 25 to 50 percent slopes, severely eroded

This is a steep, shallow, excessively drained soil on side slopes of highly dissected uplands. It formed mostly in calcareous shale that has some thin beds of limestone. Areas of this soil range from 5 to 200 acres in size.

In a typical area the surface layer of this soil is yellowish brown channery silty clay loam about 5 inches thick. The surface layer consists mainly of material from the subsoil because the original surface layer has been removed by erosion. The subsoil is light yellowish brown very channery silty clay loam. Soft, weathered, calcareous shale is between depths of 10 and 25 inches. Hard, calcareous shale is at a depth of 25 inches.

This soil is neutral to moderately alkaline. Available water capacity is very low. Permeability is moderately slow. Depth to bedrock is less than 20 inches.

Included with this Dandridge soil in mapping are some areas of rock outcrops.

In most areas this soil is used as woodland. In a few areas it is used as pasture. It is poorly suited to woodland because of the shallow or very shallow root zone and the very low available water capacity. Virginia pine and eastern redcedar are common on this soil. Because of slope, erosion is a hazard during harvesting and reforestation. Steep slopes make the use of equipment more hazardous or limit the usefulness of certain types of equipment. Seedling survival is a severe problem on this soil because of a moisture deficiency. The problem is worse on south- and west-facing slopes, which are warmer and drier. Increasing the planting rate helps to obtain an adequate stand. Windthrow is a severe hazard because of the shallow or very shallow root zone.

This soil is poorly suited to pasture. It is not suited to hay and cropland because of steep slopes, the shallow or very shallow root zone, and the very low available water capacity. Good pasture management is needed to control erosion and maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

This soil is poorly suited to most urban uses because of steep slopes, shallow depth to bedrock, and the large amount of rock fragments in the soil.

This soil is in land capability subclass VIIe.

DaF2—Dandridge channery silt loam, 25 to 70 percent slopes, eroded

This is a steep and very steep, shallow, excessively drained soil on the side slopes of highly dissected uplands. It formed mostly in calcareous shale that has some thin beds of limestone. Areas of this soil range from 40 to 70 acres in size.

In a typical area the surface layer of this soil is brown channery silt loam about 3 inches thick. In the upper part the subsoil is yellowish brown very channery silty clay loam that has intermittent pockets of dark yellowish brown very channery silty clay. In the lower part it is light yellowish brown very channery silty clay loam. Soft, weathered, calcareous shale is between depths of 17 and 35 inches. Hard, calcareous shale is at a depth of 35 inches.

This soil is neutral to moderately alkaline. Available water capacity is very low. Permeability is moderately slow. Depth to bedrock is less than 20 inches.

Included with this Dandridge soil in mapping are a few small areas of soils that are deeper than 20 inches to soft shale. Also included are some spots of severely eroded soils and some rock outcrops.

In most areas this soil is used as woodland. Although the soil is poorly suited to commercial timber production, woodland is the most feasible use. Southern red oak, Virginia pine, and eastern redcedar are common on this soil. Because of slope, erosion is a hazard during harvesting and reforestation. Steep slopes make the use of equipment more hazardous or limit the usefulness of certain types of equipment. Seedling survival is a moderate problem because of a moisture deficiency. The problem is worse on south- and west-facing slopes, which are warmer and drier. Increasing the planting rate helps to obtain an adequate stand. Windthrow is a severe hazard because of the shallow root zone.

This soil is poorly suited to pasture. It is not suited to hay or cropland because of the steep or very steep slopes, shallow root zone, and very low available water capacity.

This soil is poorly suited to urban uses. The main limitations are the steep or very steep slopes, shallow depth to bedrock, and the large amount of rock fragments in the soil.

This soil is in land capability subclass VIIe.

DcB2—Decatur silt loam, 2 to 5 percent slopes, eroded

This is a gently sloping, very deep, well drained soil on broad, smooth ridgetops on uplands. This soil formed in residuum derived from limestone. Individual areas of this soil range from 5 to 40 acres in size.

In a typical area the surface layer of this soil is dark reddish brown silt loam about 6 inches thick. In the upper part the subsoil is dark reddish brown silt loam and dark reddish brown and dark red silty clay loam. In the lower part it is dark red and red silty clay to a depth of 65 inches or more.

This soil is medium acid or strongly acid, but where limed the surface layer is less acid. Permeability is moderate. Available water capacity is high. Depth to bedrock is more than 72 inches.

Included with this Decatur soil in mapping are areas of Dewey soils on the steepest part of the unit. Also included are some small, concave areas of Etowah soils.

This soil is used mainly for row crops and small grain. It is well suited to row crops, small grain, hay, and pasture. It is suited to all adapted crops, grasses, and legumes. Erosion is a hazard if cultivated crops are grown. A combination of conservation practices helps to reduce runoff, to control erosion, to conserve moisture, and to maintain tilth.

This soil is well suited to woodland. Yellow poplar, white oak, southern red oak, shortleaf pine, loblolly pine, and eastern white pine are all suited to this soil. Plant competition is the only significant management concern. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is well suited to most urban uses. Shrink-swell potential and low strength are moderate limitations for some uses. These limitations can be overcome by proper design of structures and facilities.

This soil is in land capability subclass IIe.

DeC2—Dewey silt loam, 5 to 12 percent slopes, eroded

This is a sloping, very deep, well drained soil on convex ridgetops and on the upper side slopes of uplands. This soil formed in 1 to 2 feet of old alluvium and in the underlying residuum derived from limestone. Individual areas of this soil range from 5 to 60 acres in size.

In a typical area the surface layer of this soil is dark brown silt loam about 7 inches thick. The subsoil is dark red and red silty clay to a depth of 65 inches or more.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Permeability is moderate. Available water capacity is moderate or high. Depth to bedrock is more than 60 inches.

Included with this Dewey soil in mapping are some small areas of Dunmore and Etowah soils. Dunmore soils do not have dark red colors anywhere in the subsoil. Etowah soils are in concave areas and have a loamy subsoil. Also included, on knolls and shoulder slopes, are some areas of severely eroded soils.

This soil is used mostly for cropland, hay, and pasture. It is moderately suited to row crops and is well suited to small grains, hay, and pasture. It is suited to most adapted crops, grasses, and legumes. Erosion is a severe hazard if cultivated crops are grown. Combined conservation practices help to reduce runoff, to control erosion, to conserve moisture, and to maintain tilth.

This soil is well suited to woodland. Yellow poplar, white oak, southern red oak, shortleaf pine, loblolly pine, and Virginia pine are suited to this soil. Plant competition is a management concern. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is moderately suited to most urban uses. Slope, shrinking and swelling, and low strength in the clayey subsoil are moderate limitations for several uses. This soil can be used for structures and facilities designed to overcome these limitations.

This soil is in land capability subclass IIIe.

DeC3—Dewey silty clay loam, 5 to 12 percent slopes, severely eroded

This is a sloping, very deep, well drained soil on convex ridgetops and on the upper side slopes of uplands. This soil has some shallow gullies. It formed in a thin layer of old alluvium and in the underlying residuum of limestone. Individual areas of this soil range from 5 to 60 acres in size.

In a typical area the surface layer of this soil is dark reddish brown silty clay loam about 5 inches thick. The surface layer consists mainly of material from the subsoil because the original surface layer has been removed by erosion. The subsoil is dark red and red silty clay to a depth of 65 inches or more.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Permeability is moderate. Available water capacity is moderate or high. Depth to bedrock is more than 60 inches.

Included with this Dewey soil in mapping are some small areas of Dunmore and Etowah soils. Dunmore soils do not have dark red colors anywhere in the

subsoil. Etowah soils are in concave areas and have a loamy subsoil. Also included are some areas of moderately eroded soils.

This soil is used mostly for hay and pasture. It is poorly suited to row crops and moderately suited to small grains, hay, and pasture. Erosion is a severe hazard if cultivated crops are grown. Combined conservation practices help to reduce runoff, to control erosion, to conserve moisture, and to maintain tilth.

This soil is well suited to woodland. Yellow poplar, white oak, southern red oak, shortleaf pine, loblolly pine, and Virginia pine are suited to this soil. Plant competition is a management concern. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is moderately suited to most urban uses. Slope, shrinking and swelling, and the low strength of the clayey subsoil are moderate limitations for most uses. This soil can be used for structures and facilities designed to overcome the limitations.

This soil is in land capability subclass IVe.

DeD2—Dewey silt loam, 12 to 20 percent slopes, eroded

This is a moderately steep, very deep, well drained soil on side slopes of ridges on uplands. This soil formed in 1 to 2 feet of old alluvium and in the underlying residuum of limestone. Individual areas of this soil range from 5 to 40 acres in size.

In a typical area the surface layer of this soil is dark brown silt loam about 7 inches thick. The subsoil is dark red and red silty clay to a depth of 65 inches or more.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Permeability is moderate. Available water capacity is moderate or high. Depth to bedrock is more than 60 inches.

Included with this Dewey soil in mapping are some small areas of Etowah soils. Etowah soils are in concave areas and have a loamy subsoil. Also included are some areas of severely eroded soils on knolls and shoulder slopes.

This soil is used mostly for hay and pasture. It is poorly suited to row crops and moderately suited to hay and pasture. This soil is suited to most adapted grasses and legumes. Erosion is a severe hazard if cultivated crops are grown. Good pasture management is needed to control erosion and to maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

This soil is well suited to woodland. Yellow poplar, white oak, southern red oak, shortleaf pine, loblolly pine, and Virginia pine are suited to this soil. Because of slope the erosion hazard and the equipment limitation are moderate during timber harvesting. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is moderately suited to most urban uses. Slope, shrinking and swelling, and the low strength of the clayey subsoil are limitations for most uses. This soil can be used for structures and facilities designed to overcome the limitations.

This soil is in land capability subclass IVe.

DeD3—Dewey silty clay loam, 12 to 20 percent slopes, severely eroded

This is a moderately steep, very deep, well drained soil on side slopes of ridges on uplands. It has some shallow gullies. It formed in a thin layer of old alluvium and in the underlying residuum of limestone. Individual areas of this soil range from 5 to 40 acres in size.

In a typical area the surface layer of this soil is dark reddish brown silty clay loam about 5 inches thick. The surface layer consists mostly of material from the subsoil because the original surface layer has been removed by erosion. The subsoil is dark red and red silty clay to a depth of 65 inches or more.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Permeability is moderate. Available water capacity is moderate or high. Depth to bedrock is more than 60 inches.

Included with this Dewey soil in mapping are some small areas of Dunmore and Etowah soils. Dunmore soils are not dark red anywhere in the subsoil. Etowah soils are in concave areas and have a loamy subsoil. Also included are some areas of moderately eroded soils.

This soil is used mostly for hay and pasture. It is poorly suited to row crops, small grain, and hay. It is moderately suited to pasture. Erosion is a very severe hazard if cultivated crops are grown. Good pasture management is needed to control erosion and to maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

This soil is moderately suited to woodland. Loblolly pine, Virginia pine, eastern white pine, and eastern redcedar are suited to planting. Because of slope, the erosion hazard and the equipment limitation are moderate during timber harvesting. Seedling survival is a moderate problem on this soil because of a moisture deficiency. The problem is worse on south- and west-facing slopes, which are warmer and drier.

Increasing the planting rate helps to obtain an adequate stand. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is moderately suited to most urban uses. Slope, shrinking and swelling, and the low strength in the clayey subsoil are limitations for most uses. This soil can be used for structures and facilities designed to overcome the limitations.

This soil is in land capability subclass VIe.

DfD2—Dewey-Rock outcrop complex, 5 to 20 percent slopes, eroded

This map unit consists of a sloping and moderately steep Dewey soil and Rock outcrop in areas so small and so intermingled that the components could not be separated in mapping. The unit is on the tops and sides of ridges. Areas of this soil and rock outcrops range from 5 to 60 acres in size.

The Dewey soil makes up about 65 percent of each mapped area. In a typical area the surface layer is dark brown silt loam about 7 inches thick. The subsoil is dark red and red silty clay to a depth of 65 inches or more.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Permeability is moderate. Available water capacity is moderate or high. Depth to bedrock is more than 60 inches.

Rock outcrop makes up about 25 percent of each mapped area. It consists of limestone outcrops, most of which extend a few inches to about 3 feet above the surface.

Included with the Dewey soil and rock outcrops in mapping are small areas of Collegedale and Talbott soils. Collegedale soils are yellowish red in the subsoil and do not have a dark surface layer. Talbott soils are less than 40 inches deep to limestone.

This map unit is used mostly for woodland and is moderately suited to this use. Because of slope, erosion is a moderate hazard during timber harvesting. Slope and numerous rock outcrops are moderate limitations to use of equipment. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This map unit is not suited to crops and hay. It is poorly suited to pasture. Good pasture management is difficult because of numerous rock outcrops.

This map unit is poorly suited to most urban uses because of slope and numerous rock outcrops. Some areas can be used for structures and facilities designed around rock outcrops.

This map unit is in land capability subclass VIs.

Dm—Dumps, mine

This unit consists of areas stockpiled during the underground mining of sphalerite (zinc sulfide). The spoil has been smoothed to form nearly level to moderately steep tops and moderately steep to very steep side slopes. The tops are 100 to 1,500 feet or more across. The sides are more than 100 feet high in places. These piles of spoil are located mainly in the areas of Jefferson City and New Market.

Mapped areas range from 10 to 100 acres in size. Slopes are dominantly 5 to 12 percent on the tops, but the range is 2 to 20 percent. The side slopes range from 20 to 75 percent or more and are commonly nearly vertical.

The spoil is consistent in color, texture, and thickness. It is light gray loamy fine sand that extends to a depth of 6 feet or more.

Natural fertility, organic matter content, and available water capacity are low. Reaction ranges from mildly alkaline to strongly alkaline.

Included with Dumps, mine, in mapping are small areas of Collegedale and Talbott soils, which have not been covered by mine spoil. Also included are piles of limestone spoil.

Dumps, mine, are not suited to farming, woodland, or urban uses. These materials are a difficult medium in which to grow plants. They are droughty and highly alkaline and have steep side slopes. Experimental plots are needed to determine which grasses and trees will grow on these materials.

This map unit is not assigned to a land capability subclass.

DuB2—Dunmore silt loam, 2 to 5 percent slopes, eroded

This is a gently sloping, very deep, well drained soil on ridgetops on uplands. It formed in residuum derived from dolomitic limestone. Individual areas of this soil are 5 to 60 acres.

In a typical area the surface layer of this soil is dark brown silt loam about 6 inches thick. In the upper part the subsoil is yellowish red silty clay loam and silty clay. In the lower part it is yellowish red and red clay to a depth of 65 inches or more.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Permeability is moderate. Available water capacity is moderate or high. Depth to bedrock is more than 60 inches.

Included with this Dunmore soil in mapping are some small areas of Fullerton and Minvale soils. Fullerton soils contain 15 to 35 percent chert

fragments in the subsoil. Minvale soils are on benches and foot slopes and have a loamy subsoil.

This soil is used mostly for row crops, hay, and pasture. It is well suited to these uses. It is suited to most adapted crops, grasses, and legumes. Erosion is a moderate hazard if cultivated crops are grown. Combined conservation practices help to reduce runoff, to control erosion, to conserve moisture, and to maintain tilth. Good pasture management is needed to control erosion and to maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

This soil is well suited to woodland. Yellow poplar, black walnut, loblolly pine, shortleaf pine, and eastern white pine are suited to planting. Plant competition is a management concern. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

The soil is moderately suited to most urban uses. Moderate permeability, moderate shrink-swell potential, and low strength are limitations for several uses. This soil can be used for structures and facilities designed to overcome the limitations.

This soil is in land capability subclass IIe.

DuC2—Dunmore silt loam, 5 to 12 percent slopes, eroded

This is a sloping, very deep, well drained soil on convex ridgetops and upper side slopes. It formed in residuum derived from dolomitic limestone. Individual areas of this soil are 5 to 75 acres in size.

In a typical area the surface layer of this soil is dark brown silt loam about 6 inches thick. In the upper part the subsoil is yellowish red silty clay loam and silty clay. In the lower part it is yellowish red and red clay to a depth of 65 inches or more.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Permeability is moderate. Available water capacity is moderate or high. Depth to bedrock is more than 60 inches.

Included with this Dunmore soil in mapping are some small areas of Fullerton soils. Fullerton soils contain 15 to 35 percent chert fragments in the subsoil.

In most areas this soil is used for row crops, hay, or pasture. It is moderately suited to these uses. It is suited to most adapted crops, grasses, and legumes. Erosion is a severe hazard if cultivated crops are grown. Combined conservation practices help to reduce runoff, to control erosion, to conserve moisture, and to maintain tilth. Good pasture management is needed to control erosion and to maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

This soil is well suited to woodland. Yellow poplar, black walnut, loblolly pine, shortleaf pine, and eastern white pine are suited to planting. Plant competition is the only significant management concern. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

The soil is moderately suited to most urban uses. Slope, moderate permeability, moderate shrink-swell potential, and low strength are limitations for several uses. This soil can be used for structures and facilities designed to overcome the limitations.

This soil is in land capability subclass IIIe.

DuC3—Dunmore silty clay loam, 5 to 12 percent slopes, severely eroded

This is a sloping, very deep, well drained soil on concave ridgetops and side slopes. It formed in residuum derived from dolomitic limestone. In some areas it has a few shallow gullies. Depressions and other karst features are common on this soil. Individual areas commonly are less than 15 acres in size, but they range to 60 acres.

In a typical area the surface layer of this soil is strong brown or yellowish red silty clay loam about 6 inches thick. The surface layer consists mainly of material from the subsoil because the original surface layer has been removed by erosion. In the upper part the subsoil is yellowish red silty clay. In the lower part it is yellowish red and red clay to a depth of 65 inches or more.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Permeability is moderate. Available water capacity is moderate or high. Depth to bedrock is more than 60 inches.

Included with this Dunmore soil in mapping are some small areas of Fullerton, Minvale, and Tasso soils. Fullerton soils are in positions similar to those of the Dunmore soil and contain 15 to 35 percent chert fragments in the subsoil. Minvale and Tasso soils are on foot slopes and in depressions. They have a loamy subsoil. Tasso soils have a weak fragipan in the subsoil.

This soil is used mostly for hay and pasture. It is poorly suited to row crops and moderately suited to hay and pasture. Erosion is a severe hazard if cultivated crops are grown. Combined conservation practices help to reduce runoff, to control erosion, to conserve moisture, and to maintain tilth. Good pasture management is needed to control erosion and to

maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

This soil is moderately suited to woodland. Trees suited to planting include loblolly pine, shortleaf pine, Virginia pine, eastern white pine, and eastern redcedar. The severely eroded surface layer and the clayey subsoil cause a moderate equipment limitation and moderate seedling mortality. Increasing the planting rate helps to obtain an adequate stand. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

The soil is moderately suited to most urban uses. Slope, moderate permeability, moderate shrink-swell potential, and low strength are limitations for several uses. This soil can be used for structures and facilities designed to overcome the limitations.

This soil is in land capability subclass IVe.

DuD2—Dunmore silt loam, 12 to 20 percent slopes, eroded

This is a moderately steep, very deep, well drained soil on side slopes of uplands. It formed in residuum derived from dolomitic limestone. Some delineations have depressions and other karst features. Individual areas of this soil are commonly less than 20 acres but range to 40 acres.

In a typical area the surface layer of this soil is dark brown silt loam about 6 inches thick. In the upper part the subsoil is yellowish red silty clay loam and silty clay. In the lower part it is yellowish red and red clay to a depth of 65 inches or more.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Permeability is moderate. Available water capacity is moderate or high. Depth to bedrock is more than 60 inches.

Included with this Dunmore soil in mapping are some small areas of Fullerton soils. Fullerton soils contain 15 to 35 percent chert fragments in the subsoil. Also included are some spots of severely eroded soils that have more clay in the surface layer.

In most areas this soil is used for hay or pasture. In some areas it is used as woodland. It is poorly suited to row crops and moderately suited to hay and pasture. It is suited to most adapted grasses and legumes. Erosion is a very severe hazard if cultivated crops are grown. Good pasture management is needed to control erosion and to maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

This soil is well suited to woodland. Yellow poplar, black walnut, loblolly pine, shortleaf pine, and eastern white pine are suited to planting. Slope causes a moderate erosion hazard and equipment limitation. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

The soil is poorly suited to most urban uses. Slope, moderate permeability, moderate shrink-swell potential, and low strength are limitations for several uses. This soil can be used for structures and facilities designed to overcome the limitations.

This soil is in land capability subclass IVe.

DuD3—Dunmore silty clay loam, 12 to 20 percent slopes, severely eroded

This is a moderately steep, very deep, well drained soil on side slopes of uplands. It formed in residuum derived from dolomitic limestone. In some areas it has a few shallow gullies. Depressions and other karst features are common on this soil. Individual areas range from 4 to 20 acres in size.

In a typical area the surface layer of this soil is strong brown or yellowish red silty clay loam about 6 inches thick. The surface layer consists mainly of material from the subsoil because the original surface layer has been removed by erosion. In the upper part the subsoil is yellowish red silty clay. In the lower part it is yellowish red and red clay to a depth of 65 inches or more.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Permeability is moderate. Available water capacity is moderate or high. Depth to bedrock is more than 60 inches.

Included with this Dunmore soil in mapping are some small areas of Fullerton soils. Fullerton soils are in positions similar to those of the Dunmore soil and contain 15 to 35 percent chert fragments in the subsoil. Also included are some areas of moderately eroded soils.

This soil is used mostly for pasture and woodland. It is not suited to row crops, poorly suited to hay, and moderately suited to pasture. Good pasture management is needed to control erosion and to maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

This soil is moderately suited to woodland. Loblolly pine, shortleaf pine, Virginia pine, eastern white pine, and eastern redcedar are suited to planting. Because of slope, erosion is a moderate hazard during timber harvesting. The severely eroded surface layer and the clayey subsoil cause a moderate equipment limitation and moderate seedling mortality. Increasing the planting rate helps to obtain an adequate stand.

This soil is poorly suited to most urban uses. Slope, moderate permeability, moderate shrink-swell

potential, and low strength are limitations for several uses. This soil can be used for structures and facilities designed to overcome the limitations.

This soil is in land capability subclass VIe.

DuE2—Dunmore silt loam, 20 to 40 percent slopes, eroded

This is a steep, very deep, well drained soil on side slopes of uplands. It formed in residuum derived from dolomitic limestone. Some delineations have depressions and other karst features. Individual areas of this soil range from 5 to 50 acres in size.

In a typical area the surface layer of this soil is dark brown silt loam about 6 inches thick. In the upper part the subsoil is yellowish red silty clay loam and silty clay. In the lower part it is yellowish red and red clay to a depth of 65 inches or more.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Permeability is moderate. Available water capacity is moderate or high. Depth to bedrock is more than 60 inches.

Included with this Dunmore soil in mapping are some small areas of Fullerton and Etowah soils. Fullerton soils contain 15 to 35 percent chert fragments in the subsoil. Etowah soils are on foot slopes and in depressions. They have a loamy subsoil. Also included are some spots of severely eroded soils that have more clay in the surface layer than the Dunmore soil.

This soil is used mostly as woodland and pasture. It is not suited to row crops and hay and is poorly suited to pasture. Good pasture management is needed to control erosion and to maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

This soil is moderately suited to woodland. Yellow poplar, white oak, southern red oak, loblolly pine, shortleaf pine, and eastern white pine are common on this soil. Because of slope, erosion is a hazard during harvesting and reforestation. Steep slopes make the use of equipment more hazardous or limit the usefulness of certain types of equipment. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

The soil is poorly suited to most urban uses. Slope is a severe limitation. Moderate permeability, moderate shrink-swell potential, and low strength are moderate limitations for several uses. For most uses the slope limitation is difficult and expensive to overcome.

This soil is in land capability subclass VIIe.

DuE3—Dunmore silty clay loam, 20 to 40 percent slopes, severely eroded

This is a steep, very deep, well drained soil on side slopes of uplands. It formed in residuum derived from dolomitic limestone. In some areas it has a few shallow gullies. Depressions and other karst features are common on this soil. Individual areas of this soil range from 5 to 30 acres in size.

In a typical area the surface layer of this soil is strong brown or yellowish red silty clay loam about 6 inches thick. The surface layer consists mainly of material from the subsoil because the original surface layer has been removed by erosion. In the upper part the subsoil is yellowish red silty clay. In the lower part it is yellowish red and red clay to a depth of 65 inches or more.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Permeability is moderate. Available water capacity is moderate or high. Depth to bedrock is more than 60 inches.

Included with this Dunmore soil in mapping are some small areas of Fullerton soils. Fullerton soils are in positions similar to those of the Dunmore soil and contain 15 to 35 percent chert fragments in the subsoil. Also included are some areas of moderately eroded soils.

This soil is used mostly for woodland and pasture. It is not suited to row crops or hay and is poorly suited to pasture. Good pasture management is needed to control erosion and to maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

This soil is moderately suited to woodland. Loblolly pine, shortleaf pine, Virginia pine, eastern white pine, and eastern redcedar are suited. Because of slope, erosion is a moderate hazard during timber harvesting. The severely eroded surface layer and the clayey subsoil cause a moderate equipment limitation and moderate seedling mortality. Increasing the planting rate helps to obtain an adequate stand.

This soil is poorly suited to most urban uses. Slope is a severe limitation. Moderate permeability, moderate shrink-swell potential, and low strength are moderate limitations for several uses. For most uses the slope limitation is difficult and expensive to overcome.

This soil is in land capability subclass VIIe.

DwE3—Dunmore and Fullerton soils, 10 to 30 percent slopes, gullied

This map unit consists of Dunmore and Fullerton soils that are severely eroded in most areas and that have numerous gullies. These are moderately steep and steep, very deep, and well drained soils on the sides of ridges on uplands. Both gullied, these soils are similar in use and management. The gullies cover about 10 percent of each of these soils. They are 2 to 5 feet deep and 5 to 12 feet wide. Individual areas of Dunmore and Fullerton soils range from 5 to 50 acres in size.

Dunmore soils make up about 40 percent of this unit, but the actual percentage varies. In a typical area the surface layer of Dunmore soils is strong brown or yellowish red silty clay loam about 6 inches thick. The surface layer consists mainly of material from the subsoil because the original surface layer has been removed by erosion. In the upper part the subsoil is yellowish red silty clay. In the lower part it is yellowish red and red clay to a depth of 65 inches or more.

Dunmore soils are strongly acid or very strongly acid, but where limed the surface layer is less acid. Permeability is moderate. Available water capacity is moderate or high. Depth to bedrock is more than 60 inches.

Fullerton soils make up about 35 percent of this unit, but the actual percentage varies. In a typical area the surface layer of Fullerton soils is strong brown gravelly silty clay loam about 8 inches thick. The surface layer consists mainly of material from the subsoil because the original surface layer has been removed by erosion. The subsoil is yellowish red and red gravelly clay to a depth of 65 inches or more.

Fullerton soils are strongly acid or very strongly acid, but where limed the surface layer is less acid. Permeability is moderate. Available water capacity is moderate. Depth to bedrock is more than 60 inches.

Included with Dunmore and Fullerton soils in mapping are small areas of Collegedale and Talbott soils and some limestone outcrops. Also included are some areas of moderately eroded Dunmore and Fullerton soils.

In most areas Dunmore and Fullerton soils are used as woodland. A small acreage is used for pasture.

These soils are poorly suited to both farming and urban uses. Gullies and steep slopes are severe limitations. In many areas planting pines and eastern redcedar is needed to control erosion.

These soils are poorly suited to commercial timber production. Virginia pine, loblolly pine, and eastern redcedar are common on these soils. Slope and the gullies cause an erosion hazard and an equipment limitation and limit seedling survival. Seedling survival is worse on south- and west-facing slopes, which are warmer and drier. Increasing the planting rate helps to obtain an adequate stand. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

These soils are in capability subclass VIIe.

DxE2—Dunmore and Fullerton soils, karst, 10 to 30 percent slopes, eroded

This map unit consists of areas of Dunmore and Fullerton soils. Numerous sinkholes and depressions in this unit have been caused by solution caverns in limestone bedrock. The irregular slopes formed by sinkholes and depressions result in karst topography. Dunmore and Fullerton soils are moderately steep and steep, very deep, and well drained. In some delineations they are intermingled; in others they are not. These soils are similar in use and management.

Dunmore soils make up about 40 percent of the unit. In a typical area the surface layer of Dunmore soils is dark brown silt loam about 6 inches thick. In the upper part the subsoil is yellowish red silty clay loam and silty clay. In the lower part it is yellowish red and red clay to a depth of 65 inches or more.

Dunmore soils are strongly acid or very strongly acid, but where limed the surface layer is less acid. Permeability is moderate. Available water capacity is moderate or high. Depth to bedrock is more than 60 inches.

Fullerton soils make up about 35 percent of the unit. In a typical area the surface layer of Fullerton soils is brown gravelly silt loam about 8 inches thick. In the upper few inches the subsoil is strong brown gravelly silty clay loam. Below that, it is yellowish red and red gravelly clay to a depth of 65 inches or more.

Fullerton soils are strongly acid or very strongly acid, but where limed the surface layer is less acid. Permeability is moderate. Available water capacity is moderate. Depth to bedrock is more than 60 inches.

Included with Dunmore and Fullerton soils in mapping are small areas of Emory and Nolin soils at the bottoms of sinkholes and depressions and Minvale soils on foot slopes. These soils have a loamy subsoil. Also included, on side slopes, are small areas of Collegedale and Talbott soils and some limestone outcrops.

Dunmore and Fullerton soils are used mostly for hay and pasture. They are moderately suited to hay and pasture and poorly suited to row crops. Some small fields of tobacco and truck crops are on foot slopes and in the bottom of large depressions. The

soils are moderately suited to these uses. Good pasture management is needed to control erosion and to maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

These soils are moderately suited to woodland. Yellow poplar, black walnut, southern red oak, loblolly pine, shortleaf pine, and eastern white pine are suited to planting. Because of slope, the erosion hazard and the equipment limitation are moderate during timber harvesting and planting. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

These soils are poorly suited to most urban uses because of karst topography and slope. In most areas surface water drains into sinkholes and depressions. It is a potential hazard for ground water pollution. The solution caverns are a hazard for heavy structures. Geological investigations are needed before any large structures are built on these soils.

This map unit is in land capability subclass VIe.

Em—Emory silt loam, rarely flooded

This is a nearly level, very deep, well drained soil in drainageways and in the bottoms of sinkholes and depressions. It formed in local alluvium washed from soils on nearby slopes. Individual areas range from 5 to about 25 acres in size. Slopes range from 0 to 3 percent.

In a typical area the surface layer of the Emory soil is dark reddish brown silt loam about 7 inches thick. The subsoil is dark reddish brown silt loam. A buried soil is between depths of 21 and 65 inches or more. It is dark reddish brown silt loam over dark brown silt loam.

This soil is medium acid or strongly acid, but where limed the surface layer is less acid. Permeability is moderate. Available water capacity is high. Depth to bedrock is more than 60 inches. In most areas the soil is subject to rare flooding or ponding for very brief periods.

Included with this Emory soil in mapping are small areas of Etowah and Nolin soils. Etowah soils are on slightly higher foot slopes. Nolin soils are in the lowest areas. Also included are a few areas of soils that have some gravel on the surface and some small areas of soils that have a few inches of red, clayey overwash on the surface.

This soil is used mostly for row crops, hay, and pasture. It is well suited to these uses. It is suited to all adapted crops, grasses, and legumes. Row crops can be grown every year if crop residue is left on the soil to maintain the content of organic matter and soil tilth.

This soil is well suited to woodland. Yellow poplar, black walnut, and loblolly pine are suited to planting. Plant competition is a management concern. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is poorly suited to most urban uses where it is subject to flooding or ponding. The soil is suited to most urban uses if the flooding or ponding is overcome.

This soil is in land capability class I.

En—Ennis cobbly loam, occasionally flooded

This is a nearly level and gently sloping, very deep, well drained soil. It is in drainageways and on narrow flood plains radiating from English Mountain. This soil formed in alluvium derived from soils underlain by limestone, shale, and sandstone. Slopes range from 0 to 4 percent. Areas of this soil are mostly long and narrow and range from 5 to 50 acres in size.

In a typical area the surface layer of this soil is brown cobbly loam about 8 inches thick. The subsoil is yellowish brown cobbly loam to a depth of 30 inches. The substratum is yellowish brown very cobbly sandy loam to a depth of 60 inches or more.

This soil is medium acid to very strongly acid, but where limed the surface layer is less acid. Permeability is moderately rapid. Available water capacity is moderate. Depth to bedrock is more than 60 inches. This soil is subject to occasional flooding for brief periods.

Included with this Ennis soil in mapping are a few small areas of moderately well drained Lindside soils. Also included, on low stream terraces, are small areas of moderately well drained Swafford soils.

This soil is used for hay and pasture and is well suited to these uses. It is moderately suited to cultivated crops. The main limitations are the small size of the areas of this soil and the cobbles in the surface layer.

This soil is moderately suited to woodland. Yellow poplar, black walnut, and loblolly pine are recommended for planting. Plant competition is a management concern. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is not suited to most urban uses because of flooding.

This soil is in land capability subclass IIIs.

EtB—Etowah silt loam, 2 to 5 percent slopes

This is a gently sloping, very deep, well drained soil on stream terraces, foot slopes, and benches. It formed in alluvium or colluvium. Individual areas of this soil are mostly less than 10 acres, but the range is 4 to 25 acres in size.

In a typical area the surface layer of this soil is dark brown silt loam about 10 inches thick. The subsoil is yellowish red and red silty clay loam to a depth of 65 inches or more.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Available water capacity is high. Permeability is moderate. Depth to bedrock is more than 60 inches.

Included with this Etowah soil in mapping are some small areas of Emory soils in depressions and along drainageways.

This soil is used mostly for row crops. It is well suited to row crops, hay, and pasture. It is suited to all adapted crops, grasses, and legumes. Erosion is a moderate hazard if cultivated crops are grown. Combined conservation practices help to reduce runoff, to control erosion, to conserve moisture, and to maintain tilth.

This soil is well suited to woodland. Yellow poplar, southern red oak, and loblolly pine are well suited to planting. Plant competition is a management concern. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is well suited to most urban uses. Permeability and low strength are moderate limitations for some uses. For some uses structures and facilities need to be designed to overcome the limitations.

This soil is in land capability subclass IIe.

EtC—Etowah silt loam, 5 to 12 percent slopes

This is a sloping, very deep, well drained soil on stream terraces, foot slopes, and benches. It formed in alluvium or colluvium. Individual areas of this soil are mostly less than 10 acres, but the range is 4 to 45 acres.

In a typical area the surface layer of this soil is dark brown silt loam about 10 inches thick. The subsoil is yellowish red and red silty clay loam to a depth of 65 inches or more.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Available water capacity is high. Permeability is moderate. Depth to bedrock is more than 60 inches.

Included with this Etowah soil in mapping are some small areas of Emory soils in depressions and along drainageways.

This soil is used mostly for row crops, hay, and pasture. It is moderately suited to row crops and well suited to hay and pasture. It is suited to all adapted crops, grasses, and legumes. Erosion is a severe hazard if cultivated crops are grown. Combined conservation practices help to reduce runoff, to control erosion, to conserve moisture, and to maintain tilth.

This soil is well suited to woodland. Yellow poplar, southern red oak, and loblolly pine are well suited to planting. Plant competition is a management concern. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is moderately suited to most urban uses. Slope, permeability, and low strength are moderate limitations for most uses. This soil can be used for structures and facilities designed to overcome the limitations.

This soil is in land capability subclass IIIe.

EtD—Etowah silt loam, 12 to 25 percent slopes

This is a moderately steep, very deep, well drained soil on side slopes of high stream terraces and on foot slopes. It formed in alluvium or colluvium. Individual areas range from 4 to 20 acres in size.

In a typical area the surface layer of this soil is dark brown silt loam about 10 inches thick. The subsoil is yellowish red and red silty clay loam to a depth of 65 inches or more.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Available water capacity is high. Permeability is moderate. Depth to bedrock is more than 60 inches.

Included with this Etowah soil in mapping are a few small areas of soils that have slopes greater than 25 percent.

This soil is used mostly for hay and pasture. It is poorly suited to row crops and moderately suited to hay and pasture. It is suited to all adapted grasses and legumes. Erosion is a very severe hazard if cultivated crops are grown. Combined conservation practices help to reduce runoff, to control erosion, to conserve moisture, and to maintain tilth. Good pasture management is needed to control erosion and to maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

This soil is well suited to woodland. Yellow poplar, southern red oak, and loblolly pine are well suited to

planting. Because of slope, erosion is a hazard during timber harvesting and reforestation. Moderately steep slopes make the use of equipment more hazardous. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is poorly suited to several urban uses. Slope is a limitation for most uses, and permeability and low strength are moderate limitations for some uses. This soil can be used for structures and facilities designed to overcome the limitations.

This soil is in land capability subclass IVe.

FaE2—Farragut silt loam, 20 to 40 percent slopes, eroded

This is a steep, deep, well drained soil on side slopes of highly dissected uplands. This soil formed in a thin layer of colluvium and in the underlying residuum of shale. Individual areas of this soil range from 5 to 50 acres in size.

In a typical area the surface layer of this soil is dark reddish brown silt loam about 6 inches thick. The subsoil extends to a depth of 51 inches. It is yellowish red and red silty clay loam in the upper part, red silty clay in the middle part, and red silty clay loam in the lower part. The substratum to a depth of 65 inches is red channery silty clay loam.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Available water capacity is high. Permeability is moderately slow. Depth to bedrock ranges from 48 to 70 inches or more.

Included with this Farragut soil in mapping are a few small areas of Sequoia and Dandridge soils. Sequoia soils are less than 40 inches deep to shale. Dandridge soils are less than 20 inches deep to shale.

This soil is used for pasture and woodland. It is not suited to row crops, small grain, or hay and is poorly suited to pasture. Good pasture management is needed to control erosion and to maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

The soil is moderately suited to woodland. Yellow poplar, southern red oak, loblolly pine, and shortleaf pine are common on this soil. Because of slope, erosion is a hazard during timber harvesting and reforestation. Steep slopes make use of equipment more hazardous or limit the usefulness of certain types of equipment.

This soil is not suited to most urban uses. Steep slopes, moderately slow permeability, and low strength are the main limitations.

This soil is in land capability subclass VIIe.

FuC2—Fullerton gravelly silt loam, 5 to 12 percent slopes, eroded

This is a sloping, very deep, well drained soil on narrow ridgetops of dissected uplands. It formed in residuum derived from cherty dolomite. Individual areas of this soil range from 4 to 20 acres in size.

In a typical area the surface layer of this soil is brown gravelly silt loam about 8 inches thick. In the upper few inches the subsoil is strong brown gravelly silty clay loam. Below that, it is yellowish red and red gravelly clay to a depth of 65 inches or more.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Permeability is moderate. Available water capacity is moderate. Depth to bedrock is more than 60 inches.

Included with this Fullerton soil in mapping are a few areas of Dewey and Dunmore soils. Dewey and Dunmore soils both have less than 15 percent chert fragments in the surface layer and in the subsoil.

In most areas this soil is used for row crops, hay, or pasture. It is moderately suited to row crops, hay, and pasture. Moderate available water capacity and the small size of the areas of this soil are limitations for crops or pasture. The narrow ridgetops are surrounded by mostly wooded, steeper slopes. Erosion is a moderate hazard if cultivated crops are grown. Combined conservation practices help to reduce runoff, to control erosion, to conserve moisture, and to maintain tilth.

This soil is well suited to woodland. Yellow poplar, southern red oak, and loblolly pine are well suited to planting. Plant competition is a management concern. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is moderately suited to use as sites for dwellings. It is poorly suited to subdivisions or commercial developments because it is located on narrow ridgetops. Deep cuts are needed in building large structures.

This soil is in land capability subclass IIIe.

FuD2—Fullerton gravelly silt loam, 12 to 25 percent slopes, eroded

This is a moderately steep, very deep, well drained soil on upper side slopes of dissected uplands. It formed in residuum derived from cherty dolomite. Individual areas of this soil range from 10 to 50 acres in size.

In a typical area the surface layer of this soil is brown gravelly silt loam about 8 inches thick. In the

upper few inches the subsoil is strong brown gravelly silty clay loam. Below that it is yellowish red and red gravelly clay to a depth of 65 inches or more.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Permeability is moderate. Available water capacity is moderate. Depth to bedrock is more than 60 inches.

Included with this Fullerton soil in mapping are a few areas of Dunmore soils. Dunmore soils have less than 15 percent chert fragments in the surface layer and in the subsoil. Also included are a few areas of soils that are gravelly sandy loam in the surface layer and in the upper part of the subsoil and some spots of severely eroded soils that have a surface layer of gravelly silty clay loam.

This soil is used mostly as woodland and is moderately suited to this use. Yellow poplar, southern red oak, shortleaf pine, and loblolly pine are common on this soil. Because of slope, erosion is a hazard during timber harvesting and reforestation. Steep slopes make the use of equipment more hazardous or limit the usefulness of certain types of equipment. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is poorly suited to row crops and hay and is moderately suited to pasture. Erosion is a severe hazard if cultivated crops are grown. Combined conservation practices help to reduce runoff, to control erosion, to conserve moisture, and to maintain tilth. Good pasture management is needed to control erosion and to maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

This soil is poorly suited to most urban uses because of slope. It can be used as sites for dwellings with septic tanks that are well designed and properly installed. Deep cuts are needed in building large structures.

This soil is in land capability subclass IVe.

FuE2—Fullerton gravelly silt loam, 25 to 45 percent slopes, eroded

This is a steep, very deep, well drained soil on side slopes of dissected uplands. It formed in residuum derived from cherty dolomite. Individual areas of this soil range from 6 to 50 acres in size.

In a typical area the surface layer of this soil is brown gravelly silt loam about 8 inches thick. In the upper few inches the subsoil is strong brown gravelly silty clay loam. Below that it is yellowish red and red gravelly clay to a depth of 65 inches or more.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Permeability is moderate. Available water capacity is moderate. Depth to bedrock is more than 60 inches.

Included with this Fullerton soil in mapping are a few areas of Dunmore soils. Dunmore soils have less than 15 percent chert fragments in the surface layer and in the subsoil. Also included are some areas of soils that have chert fragments as much as 15 inches in diameter on the surface and small areas of soils that have rock outcrops and rock bluffs along the larger streams.

In nearly all areas this soil is used as woodland. It is moderately suited to this use. Yellow poplar, southern red oak, shortleaf pine, and loblolly pine are common on this soil. Because of slope, erosion is a hazard during timber harvesting and reforestation. Steep slopes make the use of equipment more hazardous or limit the usefulness of certain types of equipment.

This soil is not suited to row crops and is poorly suited to pasture because of steep slopes. Good pasture management is needed to control erosion and to maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

This soil is not suited to most urban uses because of steep slopes.

This soil is in land capability subclass VIIe.

GpD2—Gilpin channery silt loam, 12 to 25 percent slopes, eroded

This is a moderately steep, moderately deep, well drained soil on side slopes of ridges. It formed in residuum of acid shale and siltstone. Individual areas of this soil range from 5 to 40 acres in size.

In a typical area the surface layer of this soil is brown channery silt loam about 6 inches thick. In the upper part the subsoil is yellowish brown and strong brown silt loam. In the lower part it is strong brown channery silt loam and very channery silty clay loam. Soft, weathered, acid shale is at a depth of about 32 inches.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Available water capacity is low. Permeability is moderate. Depth to bedrock ranges from 20 to 40 inches.

Included with this Gilpin soil in mapping are a few small areas of Armuchee and Sequoia soils. Armuchee soils have a thin, clayey subsoil. Sequoia soils have a clayey subsoil that is redder than that of the Gilpin soil. Also included are some small areas of soils that have a surface layer of cobbly loam.

This soil is used mostly for pasture and woodland. It is poorly suited to row crops and hay and moderately

suited to pasture. Good pasture management is needed to control erosion and to maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

This soil is moderately suited to woodland. Southern red oak, Virginia pine, and shortleaf pine are common on this soil. Because of slope, erosion is a hazard during timber harvesting and reforestation. Moderately steep slopes make the use of equipment more hazardous or limit the usefulness of certain types of equipment.

This soil is poorly suited to most urban uses. Slope and depth to bedrock are the main limitations.

This soil is in land capability subclass VIe.

GpF—Gilpin channery silt loam, 25 to 70 percent slopes

This is a steep and very steep, moderately deep, well drained soil on side slopes of English Mountain and on shale ridges throughout the county. This soil formed in residuum derived from acid shale. Individual areas of this soil range from 5 to 150 acres in size.

In a typical area the surface layer of this soil is brown channery silt loam about 6 inches thick. In the upper part the subsoil is yellowish brown and strong brown silt loam. In the lower part it is strong brown channery silt loam and very channery silty clay loam. Soft, weathered, acid shale is at a depth of about 32 inches.

This soil is strongly acid or very strongly acid. Available water capacity is low. Permeability is moderate. Depth to bedrock ranges from 20 to 40 inches.

Included with this Gilpin soil in mapping are a few small areas of Armuchee and Ramsey soils. Armuchee soils have a thin, clayey subsoil. Ramsey soils are less than 20 inches deep over sandstone.

In almost every area this soil is used as woodland. Southern red oak, Virginia pine, and shortleaf pine are common on this soil. The soil is poorly suited to woodland because of the steep and very steep slopes, low available water capacity, and depth to bedrock. Because of slope, erosion is a hazard during timber harvesting and reforestation. Steep slopes make the use of equipment more hazardous or limit the usefulness of certain types of equipment.

This soil is not suited to crops and pasture or urban uses because of the steep and very steep slopes.

This soil is in land capability subclass VIIe.

GuE3—Gullied land-Dandridge complex, 15 to 50 percent slopes, severely eroded

This complex consists of Dandridge soil and gullies so intermingled they could not be separated in mapping. The Dandridge soil is moderately steep and steep, shallow, and excessively drained. It is severely eroded and is between the V-shaped gullies. The Dandridge soil formed in residuum derived from calcareous shale on hillsides of dissected uplands. Individual areas of Gullied land and the Dandridge soil range from 5 to 50 acres.

Gullied land makes up about 50 percent of each mapped area. In a typical area the gullies are 2 to 5 feet deep and 6 to 12 feet wide.

The Dandridge soil makes up about 40 percent of each mapped area. In a typical area the surface layer of this soil is yellowish brown channery silty clay loam about 5 inches thick. The surface layer consists mainly of material from the subsoil because the original surface layer has been removed by erosion. The subsoil extends to a depth of 13 inches. It is light yellowish brown very channery silty clay loam. Soft, weathered, calcareous shale is at a depth of 13 inches. Hard, calcareous shale is at a depth of 25 inches.

This soil is neutral to moderately alkaline. Available water capacity is very low. Permeability is moderately slow. Depth to bedrock is less than 20 inches.

Included in this complex in mapping are a few areas of Montevallo and Armuchee soils. Also included are areas of shale outcrops.

In most areas this map unit is used for pasture, but it supports only sparse vegetation consisting of a few bushes, native grasses, and weeds.

This unit is not suited to crops and hay and is poorly suited to pasture, woodland, and urban uses. The main limitations are shallow depth to bedrock, very low available water capacity, steep slopes, and gullies. Virginia pine and eastern redcedar are suited to planting.

This map unit is in land capability subclass VIIe.

Ln—Lindside silt loam, occasionally flooded

This is a nearly level, very deep, moderately well drained soil on flood plains. It formed in alluvium. Slopes range from 0 to 3 percent. Areas are mostly long and narrow. They range from 5 to 40 acres in size.

In a typical area the surface layer of this soil is dark brown silt loam about 10 inches thick. The subsoil is brown silt loam to a depth of 46 inches. In the lower part it is mottled in shades of brown and gray. The substratum extends to a depth of 60 inches or more. It is yellowish brown silt loam that has mottles in shades of gray and brown.

This soil is neutral or slightly acid. Available water capacity is high. Permeability is moderate. Depth to bedrock is more than 60 inches. In most areas the soil is subject to occasional flooding, but in some areas along the Holston River it is subject to rare flooding.

Included with this Lindside soil in mapping are some small areas of Nolin and Newark soils. Nolin soils are well drained. They are in slightly higher positions than the Lindside soil. Newark soils are somewhat poorly drained. They are in lower positions than the Lindside soil. Also included are a few areas of soils that have gravel in the surface layer.

In most areas this soil is used for row crops or pasture. It is well suited to row crops, hay, and pasture. It is well suited to most adapted crops, grasses, and legumes. It is only moderately suited to alfalfa and tobacco because of wetness.

This soil is well suited to woodland. Yellow poplar, white oak, black walnut, southern red oak, eastern white pine, and loblolly pine are suited to planting. Plant competition is a management concern. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is not suited to most urban uses because of flooding.

This soil is in land capability subclass IIw.

MnC—Minvale gravelly silt loam, 5 to 15 percent slopes

This is a sloping, very deep, well drained soil on benches and foot slopes. It formed in colluvium and the underlying residuum derived from cherty dolomitic limestone. Individual areas of this soil are mostly less than 10 acres, but the range is 4 to 30 acres.

In a typical area the surface layer of this soil is dark brown and yellowish brown gravelly silt loam about 9 inches thick. The subsoil is strong brown gravelly silt loam and gravelly silty clay loam in the upper part, red gravelly silty clay loam in the middle part, and red gravelly silty clay in the lower part.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Available water capacity is moderate or high. Permeability is moderate. Depth to bedrock is more than 60 inches.

Included with this Minvale soil in mapping are a few areas of Minvale soils that have less than 15 percent gravel in the surface layer. Also included are a few areas of Fullerton soils on footslopes and a few areas of soils that have a surface layer of gravelly sandy loam and a subsoil of gravelly sandy clay loam.

This soil is used mostly for pasture, hay, and row crops. It is moderately suited to row crops and well suited to hay and pasture. Erosion is a moderate hazard if cultivated crops are grown. Combined conservation practices help to reduce runoff, to control erosion, to conserve moisture, and to maintain tilth.

This soil is well suited to woodland. Yellow poplar, white oak, black walnut, and loblolly pine are suited to planting. Plant competition is a management concern. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is moderately suited to most urban uses. Slope and the landscape position of this soil are the main limitations. Designing structures and facilities to fit the landscape helps to overcome the limitations.

This soil is in land capability subclass IIIe.

MoC—Montevallo channery silt loam, 2 to 10 percent slopes

This is a gently sloping and sloping, shallow, well drained soil on low, rolling hills. It formed in residuum derived from acid shale. Individual areas of this soil range from 5 to 75 acres in size.

In a typical area the surface layer of this soil is dark brown and brown channery silt loam about 8 inches thick. The subsoil is yellowish brown very channery and extremely channery silt loam. Soft, thin-bedded, acid shale is at a depth of 16 inches.

In unlimed areas this soil ranges from medium acid to very strongly acid. Available water capacity is very low. Permeability is moderate. Depth to bedrock is less than 20 inches.

Included with this Montevallo soil in mapping are a few areas of soils that have a clayey subsoil and that contain fewer shale fragments. Also included, on some knolls, are soils that are less than 10 inches deep to soft shale. Also included, in swales, are moderately well drained soils that are deeper to shale than the Montevallo soil.

This soil is used mostly for pasture and woodland. It is poorly suited to row crops and is only moderately suited to hay and pasture. The main limitations are shallow depth to bedrock, very low available water capacity, and low fertility. Good pasture management

is needed to control erosion and to maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

This soil is poorly suited to commercial timber production. Virginia pine and eastern redcedar are suited to planting. Seedling survival is a problem on this soil because of the shallow root zone and the very low available water capacity. Increasing the planting rate helps to obtain an adequate stand. Windthrow is a hazard because of the shallow root zone.

This soil is poorly suited to urban uses. The main limitation is the shallow depth to bedrock. The soil can be used for dwellings without basements or for small commercial buildings if a sewer system is available. Adding topsoil during landscaping is needed.

This soil is in land capability subclass IVe.

MoD—Montevallo channery silt loam, 10 to 20 percent slopes

This is a moderately steep, shallow, well drained soil on low, rolling hills. It formed in residuum derived from acid shale. Individual areas of this soil range from 5 to 50 acres in size.

In a typical area the surface layer of this soil is dark brown and brown channery silt loam about 8 inches thick. The subsoil is yellowish brown very channery and extremely channery silt loam. Soft, thin-bedded, acid shale is at a depth of 16 inches.

This soil ranges from medium acid to very strongly acid except where limed. Available water capacity is very low. Permeability is moderate. Depth to bedrock is less than 20 inches.

Included with this Montevallo soil in mapping are a few areas of Sequoia and Talbott soils. Also included, on some knolls, are soils that are less than 10 inches deep to soft shale. Also included, in swales, are moderately well drained soils that are deeper to shale than the Montevallo soil.

This soil is used mostly for woodland and pasture. It is not suited to row crops and is poorly suited to hay and pasture. The main limitations are slope, shallow depth to bedrock, and very low available water capacity. Good pasture management is needed to control erosion and to maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

This soil is poorly suited to commercial timber production. Virginia pine and eastern redcedar are suited to planting. Because of slope, erosion is a hazard during timber harvesting and planting. Seedling survival is a problem on this soil because of the shallow root zone and the very low available water capacity. Increasing the planting rate helps to obtain an adequate stand. Windthrow is a hazard because of the shallow root zone.

This soil is poorly suited to urban uses. The main limitations are slope and the shallow depth to shale.

This soil is in land capability subclass VIe.

MpE—Montevallo-Armuchee complex, 15 to 50 percent slopes, gullied

This map unit consists of moderately steep and steep Montevallo and Armuchee soils on side slopes of dissected uplands. The Montevallo soil is shallow and well drained. The Armuchee soil is moderately deep and well drained. These soils are so intermingled they could not be separated at the scale selected for mapping. They formed in residuum derived from shale. Individual areas of these soils range from 5 to 50 acres.

The Montevallo soil makes up about 45 percent of each mapped area. In a typical area the surface layer is brown channery silt loam about 5 inches thick. The subsoil is yellowish brown very channery and extremely channery silt loam. Soft, thin-bedded, acid shale is at a depth of 14 inches.

The Montevallo soil ranges from medium acid to very strongly acid except where limed. Available water capacity is very low. Permeability is moderate. Depth to bedrock is less than 20 inches.

The Armuchee soil makes up 35 percent of each mapped area. In a typical area the surface layer of this soil is dark grayish brown channery silt loam about 4 inches thick. The subsoil is brown channery silt loam and strong brown channery silty clay. The substratum is strong brown very channery silty clay. Weathered shale is at a depth of 24 inches.

The Armuchee soil is strongly acid or very strongly acid. Available water capacity is low. Permeability is moderately slow. Depth to bedrock ranges from 20 to 40 inches.

Gullies make up about 10 percent of each mapped area. They are intermingled with the Montevallo and Armuchee soils. In a typical area they are 2 to 4 feet deep and 6 to 10 feet wide.

Included with the Montevallo and Armuchee soils in mapping are a few areas of Muse soils. Muse soils are deeper than 40 inches to bedrock.

These soils are used mostly for woodland. They are poorly suited to commercial timber production. Southern red oak, Virginia pine, and shortleaf pine are common on these soils. Because of slope, erosion is a hazard during timber harvesting and reforestation. Steep slopes make the use of equipment more hazardous or limit the usefulness of certain types of equipment. Seedling survival and windthrow are

problems on the Montevallo soil because of a shallow root zone.

These soils are poorly suited to farming and urban uses. Steep slopes, shallow depth to bedrock, and gullies are difficult limitations to overcome.

This map unit is in land capability subclass VIIe.

MuB—Muse silt loam, 2 to 5 percent slopes

This is a gently sloping, deep, well drained soil on foot slopes and benches. It formed in colluvium and the underlying residuum derived from shale. Individual areas of this soil range from 4 to 40 acres in size.

In a typical area the surface layer of this soil is dark brown silt loam about 9 inches thick. In the upper 7 inches the subsoil is brown silty clay loam. In the middle part it is strong brown and yellowish red silty clay. In the lower part it is yellowish red channery silty clay to a depth of 54 inches. The substratum is yellowish red very channery silty clay. Soft, clayey shale is at a depth of 60 inches.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Available water capacity is moderate or high. Permeability is slow. Depth to bedrock ranges from 40 to 60 inches.

Included with this Muse soil in mapping are small areas of Sequoia and Collegedale soils. Collegedale soils are very deep. Sequoia soils are moderately deep. Collegedale and Sequoia soils are on uplands and in higher landscape positions than the Muse soil.

This soil is used mostly for row crops, hay, and pasture and is well suited to these uses. Erosion is a moderate hazard if cultivated crops are grown. Combined conservation practices help to reduce runoff, to control erosion, to conserve moisture, and to maintain tilth. Good pasture management is needed to control erosion and to maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

This soil is well suited to woodland. Trees suited to planting include white oak, southern red oak, yellow poplar, shortleaf pine, and eastern white pine. Plant competition is a management concern. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is moderately suited to most urban uses. The main limitations are the clayey subsoil, the slow permeability, and low strength. This soil can be used for structures and facilities designed to overcome the limitations. Special designs are needed for septic tank absorption fields because of the slow permeability.

This soil is in land capability subclass IIe.

MuC—Muse silt loam, 5 to 12 percent slopes

This is a sloping, deep, well drained soil on foot slopes and benches. It formed in colluvium and the underlying residuum derived from shale. Individual areas of this soil range from 4 to 40 acres in size.

In a typical area the surface layer of this soil is dark brown silt loam about 9 inches thick. In the upper 7 inches the subsoil is brown silty clay loam. In the middle part it is strong brown and yellowish red silty clay. In the lower part it is yellowish red channery silty clay to a depth of 54 inches. The substratum is yellowish red very channery silty clay. Soft, clayey shale is at a depth of 60 inches.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Available water capacity is moderate or high. Permeability is slow. Depth to bedrock ranges from 40 to 60 inches.

Included with this Muse soil in mapping are small areas of Sequoia and Collegedale soils. Collegedale soils are very deep. Sequoia soils are moderately deep. Collegedale and Sequoia soils are on uplands and in higher landscape positions than the Muse soil.

This soil is used mostly for row crops, hay, and pasture. It is moderately suited to row crops and is well suited to hay and pasture. Erosion is a moderate hazard if cultivated crops are grown. Combined conservation practices help to reduce runoff, to control erosion, to conserve moisture, and to maintain tilth. Good pasture management is needed to control erosion and to maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

This soil is well suited to woodland. White oak, southern red oak, yellow poplar, shortleaf pine, and eastern white pine are suited to planting on this soil. Plant competition is a management concern. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is moderately suited to most urban uses. The main limitations are slope, the clayey subsoil, slow permeability, and low strength. This soil can be used for structures and facilities designed to overcome the limitations. Special design is needed for septic tank absorption fields because of the slow permeability.

This soil is in land capability subclass IIIe.

MwE—Muskingum silt loam, 25 to 50 percent slopes

This is a steep, moderately deep, well drained soil on side slopes of highly dissected uplands. This soil formed in colluvium and residuum derived from shale,

siltstone, and sandstone. Individual areas of this soil are 10 to 80 acres in size.

In a typical area the surface layer of this soil is very dark grayish brown and brown silt loam about 3 inches thick. The subsurface layer is yellowish brown silt loam 5 inches thick. The subsoil is yellowish brown and strong brown silt loam. Soft, rippable siltstone and shale are at a depth of 30 inches.

This soil is strongly acid or very strongly acid. Available water capacity is moderate. Permeability is moderate. Depth to bedrock ranges from 20 to 40 inches.

Included with this Muskingum soil in mapping are areas of Gilpin soils. Also included, in coves, are some areas of soils that are deeper than 40 inches to bedrock.

This soil is used almost entirely as woodland and is moderately suited to this use. Northern red oak, yellow poplar, Virginia pine, eastern white pine, and shortleaf pine are common on this soil. Because of slope, erosion is a hazard during timber harvesting and reforestation. Steep slopes make the use of equipment more hazardous or limit the usefulness of certain types of equipment. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is poorly suited to farming and urban uses because of steep slopes and depth to bedrock.

This soil is in land capability subclass VIIe.

Ne—Newark silt loam, frequently flooded

This is a nearly level, very deep, somewhat poorly drained soil on flood plains. It formed in alluvium. Individual areas of this soil range from 5 to 40 acres in size. Slopes range from 0 to 2 percent.

In a typical area the surface layer of this soil is brown silt loam about 6 inches thick. In the upper part the subsoil is yellowish brown silt loam that has mottles in shades of gray and brown. In the lower part it is light brownish gray silt loam to a depth of 30 inches. It is mottled in shades of brown. The substratum extends to a depth of 65 inches. It is light brownish gray silt loam that has mottles in shades of brown.

This soil ranges from medium acid to mildly alkaline. Available water capacity is high. Permeability is moderate. Depth to bedrock is more than 60 inches. A seasonal high water table is at a depth of 0.5 foot to 1.5 feet in winter and early spring. This soil is subject to frequent flooding of brief duration.

Included with this Newark soil in mapping are a few small areas of Beason, Purdy, and Swafford soils. Beason soils are somewhat poorly drained. Purdy soils are poorly drained. Beason and Purdy soils are clayey in the subsoil and are more acid than the Newark soil. Swafford soils are moderately well drained and have a fragipan.

This soil is used mostly for hay and pasture. It is moderately suited to corn and soybeans. It is well suited to such water-tolerant grasses and legumes as tall fescue and ladino clover. It is poorly suited to alfalfa and tobacco, which are sensitive to the seasonal high water table and flooding.

This soil is well suited to woodland. Trees suited to planting include eastern cottonwood, sweetgum, and American sycamore. Use of equipment is restricted to summer and fall, when the soil is driest. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is not suited to most urban uses because of the seasonal high water table and flooding. These limitations are very difficult to overcome.

This soil is in land capability subclass IIIw.

NkB2—Nolichucky loam, 2 to 5 percent slopes, eroded

This is a gently sloping, very deep, well drained soil. It is on high terraces along the French Broad and Holston Rivers. It formed in old alluvium. Individual areas of this soil are 5 to 30 acres.

In a typical area the surface layer of this soil is brown loam about 8 inches thick. In the upper few inches the subsoil is strong brown loam. Below that, it is yellowish red and red clay loam to a depth of 60 inches or more.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Available water capacity is moderate or high. Permeability is moderate. Depth to bedrock is more than 60 inches.

Included with this Nolichucky soil in mapping are small areas of Waynesboro soils. Waynesboro soils have a clayey subsoil. Also included are a few small areas of soils that have cobbles on the surface.

This soil is used mostly for cropland, hay, and pasture. It is well suited to row crops, hay, and pasture. Erosion is a moderate hazard if cultivated crops are grown. Combined conservation practices help to reduce runoff, to control erosion, to conserve moisture, and to maintain tilth.

This soil is well suited to woodland. Yellow poplar, eastern white pine, loblolly pine, and shortleaf pine are suited to planting. Plant competition is a management concern. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is well suited to most urban uses. The moderate permeability and clay content in the subsoil are moderate limitations for some uses, but these limitations are fairly easy to overcome.

This soil is in land capability subclass IIe.

NkC2—Nolichucky loam, 5 to 12 percent slopes, eroded

This is a sloping, very deep, well drained soil on side slopes of high terraces along the French Broad and Holston Rivers. It formed in old alluvium. Individual areas of this soil range from 5 to 50 acres.

In a typical area the surface layer of this soil is brown loam about 8 inches thick. In the upper few inches the subsoil is strong brown loam. Below that, it is yellowish red and red clay loam to a depth of 60 inches or more.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Available water capacity is moderate or high. Permeability is moderate. Depth to bedrock is more than 60 inches.

Included with this Nolichucky soil in mapping are small areas of Fullerton and Waynesboro soils. Fullerton and Waynesboro soils have a clayey subsoil. Fullerton soils also have more than 15 percent gravel throughout. Also included are a few small areas of soils that have cobbles on the surface.

This soil is used mostly for cropland, hay, and pasture. It is moderately suited to row crops and well suited to hay and pasture. Erosion is a severe hazard if cultivated crops are grown. Combined conservation practices help to reduce runoff, to control erosion, to conserve moisture, and to maintain tilth. Good pasture management is needed to control erosion and to maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

This soil is well suited to woodland. Yellow poplar, eastern white pine, loblolly pine, and shortleaf pine are suited to planting. Plant competition is a management concern. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is moderately suited to most urban uses. Slope, permeability, and the clay content in the subsoil are moderate limitations that generally can be overcome.

This soil is in land capability subclass IIIe.

NkD2—Nolichucky loam, 12 to 20 percent slopes, eroded

This is a moderately steep, very deep, well drained soil on side slopes of high terraces along the French Broad and Holston Rivers. It formed in old alluvium. Individual areas of this soil range from 5 to 30 acres.

In a typical area the surface layer of this soil is brown loam about 8 inches thick. In the upper few inches the subsoil is strong brown loam. Below that, it is yellowish red and red clay loam to a depth of 60 inches or more.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Available water capacity is moderate or high. Permeability is moderate. Depth to bedrock is more than 60 inches.

Included with this Nolichucky soil in mapping are small areas of Fullerton and Waynesboro soils. Fullerton and Waynesboro soils have a clayey subsoil. Fullerton soils also have more than 15 percent gravel throughout. Also included are a few small areas of soils that have cobbles on the surface.

This soil is used mostly for hay and pasture. It is poorly suited to row crops and moderately suited to hay and pasture. Erosion is a very severe hazard if cultivated crops are grown. Combined conservation practices help to reduce runoff, to control erosion, to conserve moisture, and to maintain tilth. Good pasture management is needed to control erosion and to maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

This soil is well suited to woodland. Yellow poplar, eastern white pine, loblolly pine, and shortleaf pine are suited to planting. Because of slope, erosion is a hazard during harvesting and reforestation. Moderately steep slopes make the use of equipment more hazardous. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is moderately suited or poorly suited to most urban uses. Slope, permeability, and the clay content in the subsoil are limitations. This soil can be used for structures and facilities designed to overcome the limitations.

This soil is in land capability subclass IVe.

NmD2—Nolichucky gravelly loam, 10 to 20 percent slopes, eroded

This is a moderately steep, very deep, well drained soil on side slopes of high terraces along the French Broad and Holston Rivers. It formed in old alluvium. Individual areas of this soil range from 5 to 30 acres.

In a typical area the surface layer of this soil is brown gravelly loam about 8 inches thick. In the upper few inches the subsoil is strong brown loam. Below that, it is yellowish red and red clay loam to a depth of 60 inches or more.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Available water capacity is moderate or high. Permeability is moderate. Depth to bedrock is more than 60 inches.

Included with this Nolichucky soil in mapping are small areas of Fullerton and Waynesboro soils. Fullerton and Waynesboro soils have a clayey subsoil. Fullerton soils also have more than 15 percent gravel throughout. Also included are a few small areas of soils that have cobbles on the surface.

This soil is used mostly for hay and pasture. It is poorly suited to row crops and moderately suited to hay and pasture. Erosion is a severe hazard if cultivated crops are grown. Combined conservation practices help to reduce runoff, to control erosion, to conserve moisture, and to maintain tilth. Gravel in the surface layer hinders tillage. Good pasture management is needed to control erosion and to maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

This soil is well suited to woodland. Yellow poplar, eastern white pine, loblolly pine, and shortleaf pine are suited to planting. Because of slope, erosion is a hazard during harvesting and reforestation. Moderately steep slopes make the use of equipment more hazardous. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is poorly suited to most urban uses. Slope, gravel in the surface layer, permeability, and the clay content in the subsoil are limitations. This soil can be used for structures and facilities designed to overcome the limitations.

This soil is in land capability subclass IVe.

No—Nolin silt loam, occasionally flooded

This is a nearly level, very deep, well drained soil along narrow drainageways. It formed in local alluvium derived mainly from soils underlain by limestone and calcareous shale. Individual areas of this soil range from 5 to 30 acres in size. Slopes range from 0 to 3 percent.

In a typical area the surface layer of this soil is dark brown silt loam about 7 inches thick. In the upper part the subsoil is dark yellowish brown silt loam. In the lower part it is dark brown silt loam to a depth of 60 inches or more.

This soil is medium acid to moderately alkaline. Available water capacity is high. Permeability is moderate. Depth to bedrock is more than 60 inches. This soil is subject to occasional flooding of brief duration in winter and early spring.

Included with this Nolin soil in mapping are a few small areas of Muse, Lindside, and Newark soils. Muse soils are on higher foot slopes and have a clayey subsoil. Lindside soils are moderately well drained. Newark soils are somewhat poorly drained. Lindside and Newark soils are in lower landscape positions than the Nolin soil.

In most areas this soil is used for row crops or pasture. It is in long, narrow areas and is in the same land uses as adjoining soils. It is well suited to row crops, hay, and pasture. It is suited to all adapted crops, grasses, and legumes. In some years flooding delays the planting of crops.

This soil is well suited to woodland. Black walnut, yellow poplar, cherrybark oak, and eastern white pine are well suited to planting. Plant competition is a management concern. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is poorly suited to most urban uses because of occasional flooding. A seasonal high water table below a depth of 3 feet for short periods can limit some uses. The other soil properties favor most uses.

This soil is in land capability subclass IIw.

Pu—Purdy silt loam

This is a nearly level, very deep, poorly drained soil on terraces and in depressions on uplands. It formed in clayey, slack-water deposits. Slopes are 0 to 2 percent. Individual areas of this soil are 5 to 200 acres.

In a typical area the surface layer of this soil is dark grayish brown and grayish brown silt loam about 5 inches thick. In the upper part the subsoil is grayish brown silt loam and silty clay loam and has brownish mottles. In the lower part it has brownish mottles and is grayish brown silty clay and clay to a depth of 50 inches. The substratum to a depth of 65 inches is light brownish gray silty clay.

This soil is strongly acid in the surface layer and in the subsoil and slightly acid or neutral in the substratum. Available water capacity is high. Permeability is slow or very slow. Depth to bedrock is more than 60 inches. In most years the seasonal high water table is within a depth of 1 foot in winter and early spring. Water is frequently ponded on this soil for a few days to about 2 weeks.

Included with this Purdy soil in mapping are a few small areas of Beason and Newark soils. Beason soils are somewhat poorly drained. They are in a slightly higher position on the landscape than the Purdy soil. Newark soils are somewhat poorly drained. They are on adjacent flood plains. Also included are areas of soils that are similar to the Purdy soil but have gravel and cobbles in the subsoil.

In most areas this soil is used as woodland. In a few areas it is used for pasture. It is poorly suited to row crops because of the seasonal high water table and ponding. It is moderately suited to pasture if planted to such water-tolerant grasses as tall fescue.

This soil is moderately suited to woodland. Willow oak, sweetgum, eastern cottonwood, and American sycamore are suited to this soil. The seasonal high water table limits the use of equipment and seedling survival. In most years harvesting is confined to summer and early fall, when the soil is driest. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is not suited to urban uses because of the seasonal high water table and the slowly permeable, clayey subsoil.

This soil is in land capability subclass IVw.

RaD—Ramsey-Rock outcrop complex, 12 to 25 percent slopes

This map unit consists of a Ramsey soil and Rock outcrop in areas so intermingled that the components could not be separated in mapping. The Ramsey soil is moderately steep, shallow, and somewhat excessively drained. It formed in residuum and colluvium derived from sandstone on the tops of English Mountain and on nearby high ridges. Individual areas of the Ramsey soil and Rock outcrop range from 5 to 30 acres.

The Ramsey soil makes up about 60 percent of this unit. In a typical area the surface layer is very dark grayish brown loam about 1 inch thick. The subsurface layer is brown loam 3 inches thick. The subsoil is brown and yellowish brown loam. Hard sandstone is at depth of 18 inches.

This soil is strongly acid or very strongly acid. Available water capacity is very low. Permeability is rapid. Depth to bedrock is less than 20 inches.

Rock outcrop makes up about 30 percent of the unit. The outcrops consist of large sandstone rocks and cliffs that protrude 2 to 10 feet above the surface.

Included with the Ramsey soil and Rock outcrop in mapping are areas of Gilpin and Muskingum soils. These soils both formed in siltstone and shale residuum. They are 20 to 40 inches deep over bedrock.

In almost every area this map unit is used as woodland. It is poorly suited to commercial woodland production. Northern red oak, hickory, Virginia pine, and shortleaf pine are common on this unit. Because of slope, erosion is a hazard during harvesting and reforestation. Moderately steep slopes make the use of equipment more hazardous or limit the usefulness of certain types of equipment. The very low available water capacity and shallow depth to bedrock cause moderate seedling mortality and a severe windthrow hazard.

This map unit is not suited to farming or most urban uses. Slope, depth to bedrock, and rock outcrops are severe limitations for these uses.

This map unit is in land capability subclass VIs.

RaF—Ramsey-Rock outcrop complex, 25 to 70 percent slopes

This map unit consists of a Ramsey soil and Rock outcrop in areas so intermingled that the components could not be separated in mapping. The Ramsey soil is steep and very steep, shallow, and somewhat excessively drained. It formed in residuum and colluvium derived from sandstone on the sides of English Mountain and of nearby high ridges. Individual areas of the Ramsey soil and Rock outcrop range from 5 to 75 acres.

The Ramsey soil makes up about 60 percent of this unit. In a typical area the surface layer of this soil is very dark grayish brown loam about 1 inch thick. The subsurface layer is brown loam 3 inches thick. The subsoil is brown and yellowish brown loam. Hard sandstone is at a depth of 18 inches.

This soil is strongly acid or very strongly acid. Available water capacity is very low. Permeability is rapid. Depth to bedrock is less than 20 inches.

Rock outcrop makes up about 30 percent of the unit. It consists of large sandstone rocks and cliffs that protrude 2 to 10 feet above the surface.

Included with the Ramsey soil and Rock outcrop in mapping are areas of Gilpin and Muskingum soils. These soils both formed in siltstone and shale residuum. They are 20 to 40 inches deep over bedrock.

In nearly all areas this map unit is used as woodland. It is poorly suited to commercial woodland production. Northern red oak, hickory, Virginia pine, and shortleaf pine are common on this soil. Because of slope, erosion is a hazard during harvesting and reforestation. Steep slopes make the use of equipment more hazardous or limit the usefulness of certain types of equipment. The very low available water capacity and shallow depth to bedrock cause moderate seedling mortality and a severe windthrow hazard.

This map unit is not suited to farming or urban uses. The severe limitations of steep slopes, depth to bedrock, and rock outcrops are very difficult to overcome.

This map unit is in land capability subclass VIIs.

SeB2—Sequoia silt loam, 2 to 5 percent slopes, eroded

This is a gently sloping, moderately deep, well drained soil on ridgetops of dissected uplands. These soils formed in clayey residuum derived from acid shale. Individual areas of this soil range from 3 to 20 acres in size.

In a typical area the surface layer of this soil is dark yellowish brown silt loam about 5 inches thick. The subsoil is dark yellowish brown silty clay loam in the upper part, strong brown silty clay in the middle part, and strong brown silty clay loam in the lower part. Soft shale is at a depth of 35 inches.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Available water capacity is low or moderate. Permeability is moderately slow. Depth to bedrock ranges from 20 to 40 inches.

Included with this Sequoia soil in mapping are small areas of Dandridge, Montevallo, and Muse soils. Dandridge and Montevallo soils are less than 20 inches deep over shale. Muse soils are more than 40 inches deep over bedrock.

In most areas this soil is used for hay, pasture, or woodland. It is moderately suited to row crops and well suited to hay and pasture. The low or moderate available water capacity and the moderately deep bedrock are limitations. Erosion is a moderate hazard if cultivated crops are grown. Combined conservation practices help to reduce runoff, to control erosion, to conserve moisture, and to maintain tilth.

This soil is well suited to woodland. Northern red oak, Virginia pine, and shortleaf pine are common on this soil. Plant competition is a management concern. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is moderately suited or poorly suited to most urban uses. The main limitations are depth to bedrock, shrinking and swelling, the clayey subsoil, and moderately slow permeability. The soil can be used for structures and facilities designed to overcome the limitations.

This soil is in land capability subclass IIIe.

SeC2—Sequoia silt loam, 5 to 12 percent slopes, eroded

This is a sloping, moderately deep, well drained soil on narrow, convex ridgetops and side slopes of dissected uplands. These soils formed in clayey residuum derived from acid shale. Individual areas range from 5 to 40 acres in size.

In a typical area the surface layer of this soil is dark yellowish brown silt loam about 5 inches thick. The subsoil is dark yellowish brown silty clay loam in the upper part, strong brown silty clay in the middle part, and strong brown silty clay loam in the lower part. Soft shale is at a depth of 35 inches.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Available water capacity is low or moderate. Permeability is moderately slow. Depth to bedrock ranges from 20 to 40 inches.

Included with this Sequoia soil in mapping are small areas of Dandridge and Montevallo soils. Dandridge and Montevallo soils are less than 20 inches deep over shale. Also included, near Douglas Lake, are a few areas of soils that have a loamy terrace deposit in the upper part.

In most areas this soil is used for hay, pasture, or woodland. It is poorly suited to row crops and well suited to hay and pasture. Slope, depth to bedrock, and low or moderate available water capacity are limitations. Erosion is a severe hazard if cultivated crops are grown. Combined conservation practices help to reduce runoff, to control erosion, to conserve moisture, and to maintain tilth. Good pasture management is needed to control erosion and to maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

This soil is well suited to woodland. Northern red oak, Virginia pine, and shortleaf pine are common on this soil. Plant competition is a management concern. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is moderately suited or poorly suited to most urban uses because of slope, depth to bedrock, shrinking and swelling, the clayey subsoil, and moderately slow permeability. This soil can be used for structures and facilities designed to overcome the limitations.

This soil is in land capability subclass IVe.

SeC3—Sequoia silty clay loam, 5 to 12 percent slopes, severely eroded

This is a sloping, moderately deep, well drained soil on narrow, convex ridgetops and side slopes of dissected uplands. These soils formed in clayey residuum derived from acid shale. Individual areas of this soil range from 3 to 15 acres in size.

In a typical area the surface layer of this soil is dark yellowish brown silty clay loam about 5 inches thick. The surface layer consists mainly of material from the subsoil because the original surface layer has been

removed by erosion. In the upper few inches the subsoil is strong brown silty clay loam. Below that, it is strong brown silty clay and channery silty clay. Soft shale is at a depth of 30 inches.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Available water capacity is low or moderate. Permeability is moderately slow. Depth to bedrock ranges from 20 to 40 inches.

Included with this Sequoia soil in mapping are areas of moderately eroded soils that have a surface layer of silt loam.

In most areas this soil is used for pasture or woodland. It is not suited to row crops and is moderately suited to pasture. The low or moderate available water capacity, the texture of the surface layer, slope, and depth to bedrock are limitations. Good pasture management is needed to control erosion and to maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

This soil is moderately suited to woodland. Northern red oak, Virginia pine, and shortleaf pine are common on this soil. The clay content of the severely eroded surface layer and the clayey subsoil limit equipment use and seedling survival. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is moderately suited or poorly suited to most urban uses because of slope, depth to bedrock, shrinking and swelling, the clayey subsoil, and moderately slow permeability. This soil can be used for structures and facilities designed to overcome the limitations.

This soil is in land capability subclass VIe.

SeD2—Sequoia silt loam, 12 to 20 percent slopes, eroded

This is a moderately steep, moderately deep, well drained soil on side slopes of dissected uplands. It formed in clayey residuum derived from acid shale. Individual areas range from 5 to 40 acres in size.

In a typical area the surface layer of this soil is dark yellowish brown silt loam about 5 inches thick. The subsoil is dark yellowish brown and strong brown silty clay loam in the upper part, strong brown silty clay in the middle part, and strong brown channery silty clay in the lower part. Soft shale is at a depth of 35 inches.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Available water capacity is low or moderate. Permeability is moderately slow. Depth to bedrock ranges from 20 to 40 inches.

Included with this Sequoia soil in mapping are small areas of Dandridge, Montevallo, and Muse soils. Dandridge and Montevallo soils are in positions similar to those of the Sequoia soil and are less than 20 inches deep over shale. Muse soils are on foot slopes and are more than 40 inches deep over bedrock.

In most areas this soil is used for pasture or woodland. It is not suited to row crops and is moderately suited to pasture. Slope, depth to bedrock, and low or moderate available water capacity are the main limitations. Good pasture management is needed to control erosion and to maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

This soil is moderately suited to woodland. Northern red oak, Virginia pine, and shortleaf pine are common on this soil. Because of slope, erosion is a hazard during harvesting and reforestation. Moderately steep slopes make the use of equipment more hazardous or limit the usefulness of certain types of equipment. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is poorly suited to most urban uses because of slope, depth to bedrock, shrinking and swelling, the clayey subsoil, and moderately slow permeability. This soil can be used for structures and facilities designed to overcome the limitations.

This soil is in land capability subclass VIe.

St—Staser fine sandy loam, overwash, rarely flooded

This is a nearly level, very deep, well drained soil on bottom lands of the Holston River. It formed in loamy alluvium. Individual areas of this soil range in size from 5 to 30 acres. Most areas are long and narrow. Slopes range from 0 to 2 percent.

In a typical area the surface layer is dark brown fine sandy loam about 10 inches thick. The subsurface layer is dark brown and very dark grayish brown loam and silt loam to a depth of 28 inches. The subsoil is dark brown and brown silt loam and loam to a depth of 65 inches.

This soil is medium acid to neutral. Available water capacity is high. Permeability is moderate or moderately rapid. Depth to bedrock is more than 60 inches. A flood-control dam protects this soil, but rare flooding is a hazard in some areas. A seasonal high water table is below a depth of 3 feet in winter and early spring.

Included with this Staser soil in mapping are small areas of Sequatchie soils on slightly higher terraces and small areas of moderately well drained soils in

positions slightly lower than those of the Staser soil. Also included are some small sand and gravel bars.

In most areas this soil is used for row crops or hay. It is well suited to these uses. Turning under crop residue and green manure crops adds organic matter to the soil and maintains good tilth.

This soil is well suited to woodland. Yellow poplar, black walnut, white oak, and loblolly pine are well suited to planting. Plant competition is a management concern. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is not suited to some urban uses because of flooding. It is not suited to some sanitary facilities because of seepage. In planning sites for dwellings or small commercial buildings, an onsite investigation is needed to determine if flooding is a hazard.

This soil is in land capability class I.

SwB—Swafford silt loam, 1 to 4 percent slopes, rarely flooded

This is a nearly level and gently sloping, very deep, moderately well drained soil that has a weak fragipan in the subsoil. This soil formed in old alluvium on broad terraces of major streams. Individual areas are long and narrow and range from 5 to 50 acres.

In a typical area the surface layer of this soil is brown silt loam about 9 inches thick. In the upper part the subsoil is yellowish brown silt loam. In the middle part it is brownish yellow clay loam that is compact and brittle. In the lower part it is strong brown clay loam. In the middle and lower parts it is mottled in shades of gray and red.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Available water capacity is high. Permeability is moderately slow. Depth to bedrock is more than 60 inches. This soil is subject to rare flooding. A seasonal high water table is at a depth of 2 to 3 feet in winter and early spring.

Included with this Swafford soil in mapping are small areas of Sequatchie soils on slightly higher terraces. Also included are small areas of Lindside and Newark soils on slightly lower bottom lands.

This soil is used mostly for row crops, hay, and pasture. It is well suited to these uses. It is poorly suited to alfalfa and tobacco, which are sensitive to wetness. Erosion is a slight hazard if cultivated crops are grown.

This soil is poorly suited to most urban uses because of the seasonal high water table, the moderately slow permeability, and rare flooding.

The soil is in land capability subclass IIe.

TaE2—Talbott-Rock outcrop complex, karst, 10 to 35 percent slopes, eroded

This map unit consists of a Talbott soil and Rock outcrop in areas so intermingled that the components could not be separated in mapping. The Talbott soil is moderately steep and steep, moderately deep, and well drained. It has numerous sinkholes and depressions caused by solution caverns in the underlying limestone bedrock. The irregular slopes formed by the sinkholes and depressions create the karst topography. Individual areas of the Talbott soil and rock outcrops range from 5 to 100 acres in size.

The Talbott soil makes up about 50 percent of this unit, but the percentage varies from one area to another. In a typical area the surface layer of this soil is dark brown silt loam about 4 inches thick. In the upper few inches the subsoil is yellowish red silty clay loam. Below that, it is yellowish red and red clay. Limestone is at a depth of 32 inches.

The Talbott soil ranges from slightly acid to strongly acid. Available water capacity is low or moderate. Permeability is moderately slow. Depth to bedrock ranges from 20 to 40 inches.

Rock outcrop makes up about 40 percent of this unit, but the percentage varies from 30 to 50 percent. The outcrops consist of limestone rocks that are mostly in bands parallel to the slope and that protrude a few inches to about 3 feet above the surface.

Included with the Talbott soil and Rock outcrop in mapping are small areas of soils similar to the Talbott soil. Depth to bedrock in these included soils is less than 20 inches in some areas and more than 40 inches in other areas. These included soils are adjacent to tilted bedrock. Also included are soils that have a dark surface layer and a brown and olive clay subsoil. Also included, on bluffs along major streams, are some soils that have slopes of more than 35 percent.

In nearly all areas this map unit is used as woodland. In a few areas it is used for pasture. It is poorly suited to commercial woodland production. Blackjack oak, eastern redcedar, Virginia pine, and shortleaf pine are common on this unit. Rock outcrops, the clayey soil, and slope limit the use of equipment.

This soil is poorly suited to farming and urban uses. Numerous rock outcrops, sinkholes, clayey soil, moderately slow permeability, and irregular slopes are very difficult limitations to overcome for most uses. Pasture management is not feasible on this unit because of rock outcrops and low forage production.

This map unit is in land capability subclass VIIs.

TsB—Tasso silt loam, 2 to 5 percent slopes

This is a gently sloping, very deep, well drained soil on foot slopes and benches on uplands. It has a weak or discontinuous fragipan in the subsoil. It formed in colluvium and in the underlying residuum derived from limestone or shale or in old alluvium. Individual areas of this soil range from 5 to 25 acres in size.

In a typical area the surface layer of this soil is brown silt loam about 7 inches thick. In the upper part the subsoil is yellowish brown silt loam. In the middle part it is strong brown and yellowish brown silty clay loam that is a weak or discontinuous fragipan. In the lower part it is red silty clay loam to a depth of 65 inches.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Available water capacity is moderate or high. Permeability is moderately slow. Depth to bedrock is more than 60 inches.

Included with this Tasso soil in mapping are areas of Minvale and Nolin soils. Minvale soils are on foot slopes and have more than 15 percent chert fragments throughout. Nolin soils are in small bottoms and do not have a fragipan. They have less clay in the subsoil than the Tasso soil.

This soil is used for row crops, hay, and pasture. It is well suited to these uses. Erosion is a moderate hazard if cultivated crops are grown. Combined conservation practices help to reduce runoff, to control erosion, to conserve moisture, and to maintain tilth.

This soil is well suited to woodland. Virginia pine, loblolly pine, and shortleaf pine are well suited to planting. Plant competition is a management concern. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is moderately suited to most urban uses. Moderately slow permeability is a severe limitation for septic tank absorption fields. Absorption fields need special design to function satisfactorily.

This soil is in land capability subclass IIe.

WaC2—Waynesboro loam, 5 to 12 percent slopes, eroded

This is a sloping, very deep, well drained soil on convex ridgetops and side slopes of high terraces. It formed in old alluvium. Individual areas range from 5 to 40 acres in size.

In a typical area the surface layer of this soil is yellowish brown loam about 6 inches thick. In the upper part the subsoil is yellowish red and red clay loam. In the lower part it is dark red clay to a depth of 65 inches or more.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Available water capacity is high. Permeability is moderate. Depth to bedrock is more than 60 inches.

Included with this Waynesboro soil in mapping are areas of Dewey and Etowah soils. Dewey soils have less sand in the subsoil than the Waynesboro soil. Etowah soils are in the lower lying areas and have less clay in the subsoil than the Waynesboro soil. Also included are a few areas of soils that contain more than 15 percent gravel and cobbles and some areas of severely eroded soils.

This soil is used mostly for cropland, hay, and pasture. It is moderately suited to row crops. It is well suited to hay and pasture. It is suited to all adapted crops, grasses, and legumes. Erosion is a severe hazard if cultivated crops are grown. Combined conservation practices help to reduce runoff, to control erosion, to conserve moisture, and to maintain tilth. Good pasture management is needed to control erosion and to maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

This soil is well suited to woodland. Yellow poplar, black walnut, loblolly pine, and shortleaf pine are well suited to planting. Plant competition is a management concern. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is moderately suited to most urban uses. Slope, moderate permeability, and the clayey subsoil are limitations. This soil can be used for structures and facilities designed to overcome the limitations.

This soil is in land capability subclass IIIe.

WaD2—Waynesboro loam, 12 to 20 percent slopes, eroded

This is a moderately steep, very deep, well drained soil on side slopes of high terraces. It formed in old alluvium. Individual areas of this soil range from 5 to 40 acres in size.

In a typical area the surface layer of this soil is yellowish brown loam about 6 inches thick. In the upper part the subsoil is yellowish red and red clay loam. In the lower part it is dark red clay to a depth of 65 inches or more.

This soil is strongly acid or very strongly acid, but where limed the surface layer is less acid. Available water capacity is high. Permeability is moderate. Depth to bedrock is more than 60 inches.

Included with this Waynesboro soil in mapping are

areas of Dewey and Etowah soils. Dewey soils have less sand in the subsoil than the Waynesboro soil. Etowah soils are in lower lying areas. They have less clay in the subsoil than the Waynesboro soil. Also included are some areas of severely eroded soils.

In most areas this soil is used for hay or pasture. It is poorly suited to row crops and moderately suited to hay and pasture. This soil is suited to all adapted grasses and legumes. Erosion is a very severe hazard if cultivated crops are grown. Combined conservation practices help to reduce runoff, to control erosion, to conserve moisture, and to maintain tilth. Good pasture management is needed to control erosion and to maintain productivity. It includes fertilization, weed control, and avoidance of overgrazing.

This soil is well suited to woodland. Yellow poplar, black walnut, loblolly pine, and shortleaf pine are well suited to planting. Because of slope, erosion is a hazard during harvesting and reforestation. Steepness of slope makes the use of equipment more hazardous. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is moderately suited to most urban uses. The main limitations are slope, moderate permeability, and the clayey subsoil. This soil can be used for structures and facilities designed to overcome the limitations.

This soil is in land capability subclass IVe.

Wb—Whitesburg silt loam, occasionally flooded

This is a nearly level, deep, moderately well drained soil in drainageways and on narrow bottoms and toe slopes. It formed in alluvium derived from calcareous shale. Slopes range from 0 to 3 percent. Areas range from 5 to 30 acres in size.

In a typical area the surface layer of this soil is dark yellowish brown silt loam about 7 inches thick. The subsoil, to a depth of 31 inches, is yellowish brown silty clay loam. It has brownish mottles in the upper part and grayish and brownish mottles in the lower part. The substratum is brown silty clay loam that has grayish and brownish mottles. Soft, calcareous shale is at a depth of 41 inches.

This soil is neutral or mildly alkaline. Available water capacity is high. Permeability is moderate. Depth to bedrock ranges from 40 to 60 inches. This soil is subject to occasional flooding of very brief duration in winter and early spring. The seasonal high water table is at a depth of 2 to 4 feet in winter and early spring.

Included with this Whitesburg soil in mapping are a few small areas of Lindside and Muse soils. Lindside soils are deeper than 60 inches to bedrock. Muse soils are on toe slopes. They are well drained and have a clayey subsoil. Also included, on toe slopes, are small areas of Whitesburg soils that have slopes of more than 3 percent.

In most areas this soil is used for hay or pasture and is well suited to these uses. It is well suited to most row crops. Most areas of this soil are narrow and adjacent to steeper soils; thus, growing row crops on this soil is not feasible. In some years the seasonal high water table or flooding damages tobacco grown on this soil.

This soil is well suited to woodland. Yellow poplar, black walnut, sweetgum, and eastern white pine are suited to planting. Plant competition is a management concern. Without site preparation and maintenance, undesirable plants prevent adequate natural or artificial reforestation.

This soil is not suited to most urban uses. For most uses the seasonal high water table and occasional flooding are difficult limitations to overcome.

This soil is in land capability subclass IIw.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forest land, or other land, but it is not urban or built-up land or water areas. The soil qualities, growing season, and moisture supply are those needed to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. It is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

About 21,035 acres in the survey area, or nearly 12 percent of the total acreage, meets the soil requirements for prime farmland. Most areas of this land are in general soil map units 2, 3, and 6. Most of the prime farmland is on the broad, gently sloping ridgetops, on stream terraces, and on the bottom lands. It is used mostly for crops and pasture. Some prime farmland is lost each year to urban expansion and to building or improving highways. About 14,725 acres of this prime farmland is used for row crops.

A recent trend in land use in some parts of the survey area has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in the survey area that are considered prime farmland are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

John L. Kazda, agronomist, Natural Resources Conservation Service, helped to prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the estimated yields of the main crops and pasture plants are listed for each soil; and the system of land capability classification used by the Natural Resources Conservation Service is explained.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading “Detailed Soil Map Units.” Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

According to the 1987 Census of Agriculture, 70,854 acres in the survey area was used for crops and pasture. Of this total, 28,966 acres was used as harvested cropland; 35,986 acres was cropland used only for pasture or grazing; and 5,902 acres was used as other cropland.

Urban development and highway construction are competing with agriculture for land suited to farming. In general, the soils in the survey area that are well suited to crops and pasture are also well suited to urban development, except for areas of soils that are subject to flooding. Data on specific soils in the soil survey can be used in determining future land use priorities. Potential productive capacity of the soil for agricultural products should be weighed against the limitations and potential for nonfarm development.

Protecting the soils used for cultivated crops from damaging erosion is not difficult because most of the acreage used for these crops consists of nearly level or gently sloping bottom lands and stream terraces.

Livestock farms require pasture and hay. Including grasses and legumes in the cropping system helps to control erosion on sloping land, provides nitrogen, and improves tilth for the following crop.

On Dunmore, Collegedale, Dewey, Decatur, and Fullerton soils, most slopes are so short that terracing is not practical. On these soils a cropping system that provides a substantial plant cover is needed to control erosion unless minimum tillage is used. Minimizing tillage and leaving crop residue on the surface conserve moisture and help to reduce runoff and to control erosion.

Diversions reduce the length of slopes and thus reduce runoff and the hazard of erosion. They are effective on steep or long slopes above soils on toe slopes.

Contouring and contour stripcropping are effective erosion-control practices in the survey area. They are best adapted to fairly smooth, uniform slopes, including many areas of the sloping Dewey, Decatur, and Etowah soils.

Information on the design of erosion-control practices for each kind of soil is contained in the Field Office Technical Guide available in the local office of the Natural Resources Conservation Service.

Soil drainage is a minor management need on most of the acreage used for crops and pasture in the survey area. About 800 acres of somewhat poorly drained Beason soils and about 1,200 acres of poorly drained Purdy soils are in the survey area. About half of these soils are in native forest. The artificial drainage installed in some areas of these soils makes them suitable for crops and pasture.

Most soils on uplands are very strongly acid or strongly acid in their natural state. Unless these soils have been already limed, applying ground limestone will raise the pH level sufficiently for good growth of crops that grow best on slightly acid or neutral soils. Available phosphorus and potash levels are naturally low in most soils on uplands.

Ennis, Lindside, Newark, Nolin, Whitesburg, and other soils on flood plains range from very strongly acid to mildly alkaline. They are naturally higher in plant nutrients than soils on uplands.

Additions of lime and fertilizer should be based on the results of soil tests, on the need of the crop, on the cropping history for the past 3 to 5 years, and on a realistic level of yield. The soil testing laboratory of the Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime to be applied.

A small acreage in the survey area is used for commercial specialty crops, including vegetables, fruits, and greenhouse and nursery plants. A large vegetable canning and warehouse operation is in the county. It provides a good potential for expanding the acreage used for adapted vegetables and small fruits. The latest information and suggestions on growing specialty crops can be obtained from local offices of the Cooperative Extension Service and the Natural Resources Conservation Service.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops (USDA 1961). Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland or for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use. There are no class V soils identified in Jefferson County.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop, pasture, or woodland production. There are no class VIII soils identified in Jefferson County.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry. The designation *c* is not used in Jefferson County.

In class I there are no subclasses because the soils of this class have few limitations.

The capability class and subclass for the map units in this survey area are given in the section "Detailed Soil Map Units" and in table 6.

Woodland Management and Productivity

Joseph H. Paugh, forester, Natural Resources Conservation Service, helped to prepare this section.

Woodland covers 58,500 acres, or about 34 percent of the land area, in Jefferson County. Nearly all of this woodland is under private ownership.

The oak-hickory type, covering 32,500 acres, is the most common forest type. Generally, it is on uplands. The loblolly-shortleaf pine type, covering 13,000 acres, grows throughout the county. It is commonly planted in eroded areas. The oak-pine type covers the remaining 13,000 acres of woodland. Typically, it is on dry ridges and steep south- and west-facing slopes.

Jefferson County is in an area of Tennessee where average woodland growth is 36 cubic feet per acre per year. Potential average growth for this area is 66 cubic feet per acre per year. The greatest growth potential is normally on the lower third of north- and east-facing slopes, where growth may reach 120 cubic feet per acre per year. Other values of woodland include wildlife habitat, recreation, natural beauty, and watershed protection.

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. In the table, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Erosion hazard is the probability that damage will occur as a result of site preparation and cutting where the soil is exposed along roads, skid trails, and fire lanes and in log-handling areas. Forests that have been burned or overgrazed are also subject to erosion. Ratings of the erosion hazard are based on the percent of the slope. A rating of *slight* indicates that no particular prevention measures are needed under ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that under normal conditions the kind of equipment and season of use are not significantly restricted by soil factors.

Soil wetness can restrict equipment use, but the wet period does not exceed 1 month. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil, soil wetness, or topographic conditions. The factors used in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. A rating of *slight* indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25 percent. A rating of *moderate* indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of *severe* indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

Windthrow hazard is the likelihood that trees will be uprooted by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions that affect rooting are a seasonal high water table and the depth to bedrock, a fragipan, or other limiting layers. A rating of *slight* indicates that under normal conditions no trees are blown down by the wind. Strong winds may damage trees, but they do not uproot them. A rating of *moderate* indicates that some trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of *severe* indicates that many trees can be blown down during these periods.

Plant competition ratings indicate the degree to which undesirable species are expected to invade and grow when openings are made in the tree canopy. The main factors that affect plant competition are depth to the water table and the available water capacity. A rating of *slight* indicates that competition from undesirable plants is not likely to prevent natural regeneration or suppress the more desirable species. Planted seedlings can become established without undue competition. A rating of *moderate* indicates that competition may delay the establishment of desirable species. Competition may hamper stand development, but it will not prevent the eventual development of fully stocked stands. A rating of *severe* indicates that competition can be expected to prevent regeneration unless precautionary measures are applied.

The *potential productivity* of *common trees* on a soil is expressed as a *site index* and as a *volume* number. Common trees are listed in the order of their observed general occurrence. Generally, only two or three tree species dominate.

The *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands.

The *volume* is the yield likely to be produced by the most important trees, expressed in cubic feet per acre per year calculated at the age of culmination of mean annual increment. Cubic feet can be converted to board feet by multiplying by a factor of about 5. For example, a volume of 114 means the soil can be expected to produce about 570 board feet per acre per year.

Trees to plant are those that are used for reforestation or, under suitable conditions, natural regeneration. They are suited to the soils and can produce a commercial wood crop. The desired product, topographic position (such as a low, wet area), and personal preference are three factors among many that can influence the choice of trees for use in reforestation.

Recreation

Joseph H. Paugh, forester, Natural Resources Conservation Service, helped to prepare this section.

Jefferson County has the potential for a wide variety of recreational activities. The potential is high for water sport areas; vacation cabins; vacation farms; riding stables; campgrounds; picnic and field sport areas; golf courses; warm water fishing; small game hunting; and natural, scenic, and historic areas. The potential is medium for cold water fishing, shooting preserves, and big game and waterfowl hunting.

The soils in the county generally have properties that are moderately suited to recreational activities. Attention should be given to the properties of the soils at potential recreational sites. Most limitations caused by soil properties can be overcome by careful site selection and proper design of facilities.

The soils of the survey area are rated in table 8 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil

features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In the table, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or a combination of these measures.

The information in the table can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and interpretations for dwellings without basements and for local roads and streets in table 10.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Gerald Montgomery, biologist, Natural Resources Conservation Service, helped to prepare this section.

The populations of wildlife and fish in Jefferson County are varied. The abundance and distribution of any particular species depends on the land use, amount of water, and kind of vegetation present. Some species prefer the open land of cropland, pasture, brushy fence rows, thickets, and scattered woodlots. They include cottontail, bobwhite quail, mourning dove, meadowlark, eastern bluebird, groundhog, and cardinal. These species are most abundant in a diversified vegetative cover. Some species prefer forested conditions of woodlots and timber tracts. They include white-tailed deer, grey squirrel, raccoon, and a variety of nongame birds. Shallow lakes and other wetlands provide a breeding habitat for wood ducks and resting and feeding areas for other migratory waterfowl. Wetlands are also important to such furbearers as mink, muskrat, and aquatic nongame birds. In most areas of the county, increasing the food, water, and cover that wildlife need could improve wildlife habitat.

The streams, lakes, and ponds of Jefferson County support crappie, bream, smallmouth bass, trout, and catfish. Nongame species, such as carp, buffalo, and drum, are also abundant, especially in lakes.

Soils affect the kind and amount of vegetation available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting

appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

Elements of Wildlife Habitat

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, and soybeans.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, orchardgrass, clover, annual lespedeza, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are crabgrass, goldenrod, beggarweed, ragweed, and partridge pea.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, maple, sweetgum, ash, dogwood, hickory, walnut, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are shrub lespedeza, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine and cedar.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, lake margins, and ponds.

Habitat for Various Kinds of Wildlife

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the

most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, and shrinking and swelling can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping

and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock, and the available water capacity in the upper 40 inches affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 11 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

The table also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock, and flooding affect absorption of the effluent. Large stones and bedrock interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

The table gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock, flooding, and large stones.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. Slope and bedrock can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of groundwater pollution. Ease of excavation and revegetation should be considered.

The ratings in the table are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, and soil reaction affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to wind erosion.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In the table, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as

shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, and sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The

design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind erosion or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts and sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

The methods used to determine soil properties were field examination of the soils and laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (ASTM 1993) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO 1986).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-

weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at $^1/_3$-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on the basis of measurements of similar soils.

If the shrink-swell potential is rated moderate to

very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; *high*, more than 6 percent; and *very high*, greater than 9 percent.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.64. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In the table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to two hydrologic groups in the table, the first letter is for drained areas and the second is for undrained areas.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

The table gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of flooding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of flooding is more than 50 percent in any year). *Common* is used when the occasional and frequent classes are grouped for certain purposes. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 days to 1 month, and *very long* if more than 1 month. Probable dates are expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay

deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on observations of the water table at selected sites and on the evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. Indicated in the table are the depth to the seasonal high water table; the kind of water table—that is, perched, apparent, or artesian; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in the table.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone. An *artesian* water table is under hydrostatic head, generally below an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low, moderate,* or *high.* It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (USDA 1975). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 17 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Fluvaquent (*Fluv*, meaning flood plain, plus *aquent*, the suborder of the Entisols that has an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Aeric* identifies a subgroup that is an intergrade to another subgroup that is aerated more or saturated less. An example is Aeric Fluvaquents.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle size, mineral content, soil temperature regime, soil depth, and reaction. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-silty, mixed, nonacid, mesic Aeric Fluvaquents.

SERIES. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. An example is the Newark series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" (USDA 1993). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (USDA 1975) and in "Keys to Soil Taxonomy" (USDA 1992). Unless otherwise indicated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Allen Series

The Allen series consists of very deep, well drained, moderately permeable soils. These soils formed in colluvium and residuum derived from

sandstone and shale. They are on hillsides, foot slopes, and benches. Slopes range from 5 to 40 percent.

Allen soils are near Bouldin soils, which contain more than 35 percent rock fragments in the subsoil.

Typical pedon of Allen sandy loam, 20 to 40 percent slopes, 0.3 mile east on Collier Loop off County Line Road:

Oi—1 inch to 0; hardwood and pine leaf litter.
Ap—0 to 6 inches; brown (10YR 4/3) sandy loam; moderate medium granular structure; very friable; many fine and medium and few coarse roots; common fine and medium tubular pores; 10 percent fragments of sandstone up to 3 inches in diameter; medium acid; abrupt smooth boundary.
BA—6 to 11 inches; yellowish brown (10YR 5/6) sandy loam; weak fine subangular blocky structure; very friable; many fine, common medium, and few coarse roots; many fine and common medium tubular pores; 5 percent fragments of sandstone up to 5 inches in diameter; strongly acid; clear smooth boundary.
Bt1—11 to 16 inches; yellowish red (5YR 5/6) sandy clay loam; common medium distinct red (2.5YR 4/6) mottles; moderate fine subangular blocky structure; friable; many fine and few medium roots; many fine and common medium tubular pores; few faint clay films on faces of peds; 5 percent fragments of sandstone up to 5 inches in diameter; strongly acid; clear smooth boundary.
Bt2—16 to 26 inches; red (2.5YR 4/6) clay loam; common medium prominent strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; common fine and medium roots; common fine and medium tubular pores; common distinct clay films on faces of peds; 5 percent fragments of sandstone up to 3 inches in diameter; strongly acid; clear wavy boundary.
Bt3—26 to 47 inches; red (2.5YR 4/6) clay loam; common medium prominent strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; few fine, medium, and coarse roots; common very fine and medium tubular pores; common distinct clay films on faces of peds; 5 percent fragments of sandstone up to 2 inches in diameter; strongly acid; gradual wavy boundary.
Bt4—47 to 65 inches; red (2.5YR 4/6) clay loam; common medium prominent strong brown (7.5YR 4/6) mottles; moderate medium subangular blocky structure; firm; few fine, medium, and coarse roots; common very fine and few fine tubular pores; common distinct clay films on faces of peds; 2 percent fragments of sandstone up to 1 inch in diameter; very strongly acid.

Thickness of the solum and depth to bedrock both are more than 60 inches. The soils are strongly acid or very strongly acid throughout, but where limed the surface layer is less acid. Rock fragments range from 0 to 15 percent in each horizon.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. It is sandy loam, fine sandy loam, or loam. In severely eroded areas it has hue of 5YR and chroma of 6 to 8 and is sandy clay loam or clay loam.

The BA horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is sandy loam or fine sandy loam.

The Bt horizon has hue of 5YR or 2.5YR, value of 4 to 6, and chroma of 6 to 8. It is mottled in shades of brown, yellow, and red. It is clay loam or sandy clay loam, but in some pedons it ranges to clay in the lower part.

Armuchee Series

The Armuchee series consists of moderately deep, well drained soils. These soils formed in residuum derived from acid shale. They are on highly dissected uplands. Slopes range from 10 to 60 percent.

Armuchee soils are near Sequoia, Montevallo, Gilpin, and Muskingum soils. Sequoia and Montevallo soils are on adjacent ridgetops. Sequoia soils have a solum more than 20 inches thick. Montevallo soils are less than 20 inches deep to weathered shale. Gilpin and Muskingum soils have a loamy subsoil.

Typical pedon of Armuchee channery silt loam, 25 to 60 percent slopes, eroded, in a site in the Apple Valley subdivision, 0.5 mile east of main road on private road and 100 feet south of road:

Oe—1 inch to 0; very dark gray (5YR 3/1) soil material mixed with partly decomposed hardwood litter.
A—0 to 4 inches; dark grayish brown (10YR 4/2) channery silt loam; weak fine granular structure; very friable; many fine and medium and few coarse roots; few fine tubular pores; 20 percent fragments of shale up to 1 inch in diameter; strongly acid; abrupt smooth boundary.
BE—4 to 10 inches; brown (7.5YR 5/4) channery silt loam; weak fine subangular blocky structure; friable; common fine and medium and few coarse roots; few fine and medium tubular pores; 30 percent fragments of shale up to 1 inch in diameter; very strongly acid; clear wavy boundary.
Bt—10 to 18 inches; strong brown (7.5YR 5/6) channery silty clay; moderate medium subangular blocky structure; firm; common medium fine roots; few fine tubular pores; common distinct clay films

on faces of peds; 25 percent fragments of shale up to 1 inch in diameter; very strongly acid; clear wavy boundary.

C—18 to 24 inches; strong brown (7.5YR 5/6) very channery silty clay; common fine prominent light yellowish brown (2.5Y 6/4) mottles; massive; breaks into blocky pieces along fracture planes of weathered bedrock; firm; few fine roots; 50 percent fragments of shale up to 2 inches in diameter; very strongly acid; clear wavy boundary.

Cr—24 to 50 inches; rippable shale bedrock that has thin seams of fine earth in fractures.

The solum ranges from 8 to 20 inches in thickness. Depth to weathered shale is 20 to 40 inches. In unlimed areas the soils are strongly acid or very strongly acid. Fragments of shale range from 5 to 25 percent in the A horizon, 15 to 35 percent in the B horizon, and 40 to 80 percent in the C horizon.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. In the fine earth fraction it is silt loam.

The BE horizon has hue of 7.5YR or 10YR, value of 5, and chroma of 4 to 6. In the fine earth fraction it is silt loam.

The Bt horizon has hue of 5YR or 7.5YR, value of 5, and chroma of 6 to 8. In the fine earth fraction it is silty clay or silty clay loam.

The C horizon has hue of 7.5YR or 10YR, value of 5, and chroma of 4 to 8. It has mottles in shades of brown, yellow, and red. In the fine earth fraction it is silty clay loam or silty clay.

Beason Series

The Beason series consists of very deep, somewhat poorly drained soils. These soils formed in old alluvium on low stream terraces and toe slopes. Slopes range from 0 to 2 percent.

Beason soils are on the same landscapes as Newark and Purdy soils. Newark soils are on bottom lands and do not have an argillic horizon. Purdy soils are in positions similar to those of Beason soils but are poorly drained.

Typical pedon of Beason silt loam, occasionally flooded, 100 yards northeast of the intersection of Barker and Christopher Drives; in a pastured area:

Ap—0 to 9 inches; brown (10YR 5/3) silt loam; moderate medium granular structure; very friable; many fine and medium roots; common fine tubular pores; strongly acid; abrupt smooth boundary.

AB—9 to 14 inches; brown (10YR 5/3) silt loam; few medium distinct grayish brown (2.5Y 5/2) mottles; weak medium subangular blocky structure; friable; common fine and few medium roots; common fine tubular pores; very strongly acid; clear smooth boundary.

Bt1—14 to 20 inches; light olive brown (2.5Y 5/6) silty clay loam; few medium prominent light gray (10YR 6/2) mottles; moderate medium subangular blocky structure; friable; common fine roots; common fine and medium tubular pores; few distinct clay films on faces of peds and in pores; few fine pebbles; very strongly acid; clear smooth boundary.

Bt2—20 to 25 inches; yellowish brown (10YR 5/6) silty clay loam; common medium distinct light gray (10YR 7/2) mottles; moderate medium subangular blocky structure; firm; common fine roots; few distinct clay films on faces of peds and in pores; few fine pebbles; very strongly acid; clear smooth boundary.

Bt3—25 to 35 inches; mottled yellowish brown (10YR 5/6), strong brown (7.5YR 5/8), and light gray (10YR 7/2) silty clay; moderate fine and medium subangular blocky structure; very firm; few fine roots; few fine and few medium tubular pores; few distinct clay films on faces of peds and in pores; 5 percent fine gravel; very strongly acid; gradual wavy boundary.

BC—35 to 46 inches; mottled light yellowish brown (10YR 6/4), light gray (10YR 7/2), and yellowish brown (10YR 5/8) silty clay loam; weak medium subangular blocky structure; very firm; few fine roots; common fine tubular pores; few distinct clay films on faces of peds and in pores; 5 percent fine gravel; very strongly acid; gradual smooth boundary.

C—46 to 60 inches; mottled yellowish brown (10YR 5/8) and light gray (10YR 7/1) clay loam; massive; very firm; few fine tubular pores; 5 percent fine gravel; very strongly acid.

The solum ranges from 40 to 70 inches in thickness. Depth to bedrock is more than 60 inches. The soils are strongly acid or very strongly acid, but where limed the surface layer is less acid. Content of gravel ranges from 0 to 5 percent in each horizon.

The A horizon has hue of 10YR, value of 4, and chroma of 2 or 3. It is silt loam.

The AB horizon has hue of 10YR, value of 4 or 5. and chroma of 2 or 3. It is silt loam.

The Bt horizon has hue of 10YR or 2.5Y, value of 5, and chroma of 6 to 8. In the upper 10 inches it has gray mottles. In some pedons the lower part is mottled in shades of brown and gray without a dominant color. This horizon is silty clay loam or silty clay.

The BC and C horizons have hue of 10YR, value of 5 or 6, and chroma of 1 to 4 or are mottled in shades

of brown and gray without a dominant color. They are silty clay loam, silty clay, or clay loam.

Bouldin Series

The Bouldin series consists of very deep, well drained soils that have a high content of cobbles and stones. These soils formed in colluvium from soils on higher slopes that formed in residuum derived from sandstone and shale. They are on the sides of mountains and benches. Slopes range from 12 to 70 percent.

Bouldin soils are near Allen soils, which are on foot slopes and contain less than 15 percent rock fragments.

Typical pedon of Bouldin cobbly sandy loam, 25 to 70 percent slopes, very stony, at a site 1 mile southeast on Hensley Road from intersection of Grapevine Hollow Road and Hensley Road:

Oi—2 inches to 1 inch; hardwood leaf litter.
Oe—1 inch to 0; partly decomposed leaf litter.
A—0 to 2 inches; very dark grayish brown (10YR 3/2) cobbly sandy loam; weak fine granular structure; very friable; many fine, medium, and coarse roots; common fine and medium tubular pores; 15 percent sandstone cobbles up to 4 inches in diameter; very strongly acid; abrupt smooth boundary.
BE—2 to 9 inches; strong brown (7.5YR 5/6) cobbly sandy loam; weak fine subangular blocky structure; very friable; many fine, medium, and coarse roots; common fine and few medium tubular pores; 30 percent sandstone cobbles up to 4 inches in diameter; very strongly acid; clear smooth boundary.
Bt1—9 to 20 inches; red (2.5YR 4/8) very cobbly clay loam; moderate medium subangular blocky structure; friable; many fine, medium, and coarse roots; common fine and medium and few coarse continuous tubular pores; common distinct clay films on faces of peds; 40 percent sandstone cobbles up to 4 inches in diameter; very strongly acid; clear wavy boundary.
Bt2—20 to 35 inches; red (2.5YR 4/8) extremely cobbly clay loam; moderate medium subangular blocky structure; friable; many fine, medium, and coarse roots; many fine and common medium tubular pores; common distinct clay films on faces of peds; 65 percent sandstone cobbles and stones up to 12 inches in diameter; very strongly acid; gradual wavy boundary.
Bt3—35 to 55 inches; red (2.5YR 4/8) extremely stony clay loam; moderate medium subangular blocky structure; friable; many fine and medium and few coarse roots; many fine and common medium and coarse tubular pores; many distinct clay films on faces of peds; 65 percent sandstone cobbles and stones up to 15 inches in diameter; very strongly acid; gradual wavy boundary.
Bt4—55 to 65 inches; red (2.5YR 4/8) extremely stony clay loam; moderate medium subangular blocky structure; friable; common fine and few medium roots; common fine and medium tubular pores; common distinct clay films on faces of peds; 65 percent sandstone cobbles and stones up to 24 inches in diameter; strongly acid.

Thickness of the solum and depth to bedrock are more than 60 inches. The soils are strongly acid or very strongly acid, but where limed the surface layer is less acid. Fragments of sandstone range from 15 to 40 percent in the A horizon and from 35 to 65 percent in the B horizon. They range from gravel to stones.

The A horizon has hue of 10YR and has value of 3 and chroma of 1 or 2 or value of 4 and chroma of 2. Some pedons have an E horizon, which has hue of 10YR, value of 4 to 6, and chroma of 3 or 4. In the fine earth fraction the A and E horizons are sandy loam or loam.

The BE horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8. In the fine earth fraction it is sandy loam or loam.

The Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8. In the fine earth fraction it is clay loam or sandy clay loam.

Collegedale Series

The Collegedale series consists of very deep, well drained soils. These soils formed in residuum of limestone on dissected uplands. Slopes range from 2 to 35 percent.

Collegedale soils are in positions similar to those of Talbott and Dunmore soils and are near those soils. Talbott soils are less than 40 inches deep to bedrock. Dunmore soils are kaolinitic and have moderate permeability.

Typical pedon of Collegedale silt loam, 5 to 12 percent slopes, eroded, 320 feet east of Mine Road at its junction with Universal Road, about 1 mile south of Highway 11E, near Jefferson City:

Ap—0 to 5 inches; brown (10YR 4/3) silt loam;

moderate medium granular structure; friable; many fine roots; common fine and few medium pores; 5 percent fragments of chert; strongly acid; abrupt smooth boundary.

BA 5 to 8 inches; strong brown (7.5YR 5/6) silty clay loam; weak medium subangular blocky structure; common fine roots; common fine pores; clear smooth boundary.

Bt1 8 to 17 inches; yellowish red (5YR 5/8) silty clay; common medium prominent brownish yellow (10YR 6/8) and red (2.5YR 4/6) mottles; moderate medium and fine subangular blocky structure; firm; common fine roots; few distinct clay films on faces of peds; few fragments of chert; strongly acid; clear smooth boundary.

Bt2 17 to 23 inches; yellowish red (5YR 5/8) clay; common medium prominent yellowish brown (10YR 6/8) and red (2.5YR 4/6) mottles; moderate medium angular blocky structure; very firm; common fine roots; common very fine and fine pores; many prominent clay films on faces of peds; 5 percent fragments of chert; strongly acid; clear smooth boundary.

Bt3 23 to 35 inches; yellowish red (5YR 5/8) clay; common medium and fine prominent brownish yellow (10YR 6/8) and red (2.5YR 5/6) mottles; very firm; few fine roots; common very fine and fine pores; many prominent clay films on faces of peds; 5 percent fragments of chert; strongly acid; clear wavy boundary.

Bt4 35 to 51 inches; yellowish red (5YR 5/8) clay; many medium prominent brownish yellow (10YR 6/8) and few pale brown (10YR 6/3) mottles; moderate medium angular blocky structure; very firm; few very fine and fine pores; many prominent clay films on faces of peds; strongly acid; clear wavy boundary.

Bt5 50 to 65 inches; yellowish red (5YR 5/8) clay; many medium prominent brownish yellow (10YR 6/8) and pale brown (10YR 6/3) mottles; moderate medium angular blocky structure; very firm; many distinct clay films on some faces of peds; strongly acid.

Thickness of the solum and depth to bedrock are more than 60 inches. The soils are strongly acid or very strongly acid, but where limed the surface layer is less acid. Fragments of chert range from 0 to 10 percent in each horizon.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. In eroded areas it also has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 4 to 6. It is silt loam or silty clay loam.

The BA horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is silt loam or silty clay loam.

The Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 to 8. It is mottled in shades of yellow, brown, red, or olive. In some pedons the lower part is so mottled that no one color is dominant. This horizon is silty clay or clay.

Dandridge Series

The Dandridge series consists of shallow, excessively drained soils on highly dissected uplands. These soils formed in residuum derived from calcareous shale and limestone. Slopes range from 5 to 70 percent.

Dandridge soils are near Sequoia, Muse, and Whitesburg soils. Sequoia soils are on adjacent hills and are 20 to 40 inches deep to soft shale. Muse soils are on adjacent foot slopes and are more than 40 inches deep to soft shale. Whitesburg soils are on narrow flood plains and are more than 40 inches to bedrock.

Typical pedon of Dandridge channery silt loam, 25 to 70 percent slopes, eroded, 0.6 mile east of Highway 92 on Mullins Road, 100 feet north of road; in woodland:

Oe 1 inch to 0; partly decomposed hardwood leaves.

A 0 to 3 inches; brown (10YR 4/3) channery silt loam; moderate medium granular structure; very friable; many fine, medium, and coarse roots; common fine tubular pores; 20 percent fragments of shale up to 2 inches in diameter; mildly alkaline; abrupt smooth boundary.

Bw/Bt1 3 to 7 inches; yellowish brown (10YR 5/4) channery silty clay loam (Bw part); intermittent pockets of dark yellowish brown (10YR 4/4) very channery silty clay loam with few distinct clay films on faces of peds (Bt part); weak fine subangular blocky structure; firm; common fine, medium, and coarse roots; common fine tubular pores; 35 percent fragments of shale up to 3 inches in diameter; moderately alkaline; clear smooth boundary.

Bw/Bt2 7 to 12 inches; yellowish brown (10YR 5/4) very channery silty clay loam (Bw part); intermittent pockets of dark yellowish brown (10YR 4/4) very channery silty clay with few distinct clay films on faces of peds (Bt part); weak fine and medium subangular blocky structure; firm; common fine, medium, and coarse roots; common fine tubular pores; 55 percent fragments of shale up to 3 inches in diameter; moderately alkaline; clear smooth boundary.

BC—12 to 17 inches; light yellowish brown (10YR 6/4) very channery silty clay loam; weak fine subangular blocky structure; friable; common fine and medium and few coarse roots; common fine tubular pores; 60 percent fragments of shale and limestone up to 5 inches in diameter; moderately alkaline; clear wavy boundary.
Cr—17 to 35 inches; weathered, calcareous shale bedrock with a few thin strata of limestone.
R—35 inches; hard, calcareous shale bedrock.

The solum ranges from 4 to 15 inches in thickness. Depth to soft shale ranges from 8 to 20 inches. Depth to hard bedrock is normally less than 40 inches. The soils are neutral to moderately alkaline. Fragments of shale and limestone range from 10 to 35 percent in the A horizon and from 35 to 65 percent in the B and C horizons.

The A or Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. Some pedons have an E horizon, which has hue of 10YR, value of 4 to 6, and chroma of 2 to 4. In the fine earth fraction the A, Ap, and E horizons are silt loam or silty clay loam.

The Bw and Bt horizons have hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. They have no mottles or few or common mottles in shades of brown, yellow, and red. In the fine earth fraction they are silty clay loam, silty clay, or clay. The higher clay content in the Bw horizon derived from the parent rock.

The BC horizon or the C horizon, where it occurs, has hue of 2.5Y, 10YR, or 7.5YR, value of 4 to 6, and chroma of 4 to 6. It has no mottles or few or common mottles in shades of brown, yellow, or red. In the fine earth fraction it is silty clay loam, silty clay, or clay.

Decatur Series

The Decatur series consists of very deep, well drained soils. These soils formed in residuum derived from limestone or old alluvium on broad, smooth uplands. Slopes range from 2 to 5 percent.

Decatur soils are near Dewey and Etowah soils. Dewey soils are in positions similar to those of Decatur soils, but the topography is not as smooth. In the surface layer they have colors lighter than those of Decatur soils. Etowah soils are on terraces, benches, and foot slopes. They are less clayey than Decatur soils.

Typical pedon of Decatur silt loam, 2 to 5 percent slopes, eroded, 0.5 mile southwest of Highway 92 intersection on Mine Road, 100 feet past bridge on west side of road, under a power line:

Ap—0 to 6 inches; dark reddish brown (5YR 3/3) silt loam; moderate medium granular structure; very friable; many fine and medium and few coarse roots; common medium tubular pores; neutral; abrupt wavy boundary.
BA—6 to 11 inches; dark reddish brown (5YR 3/3) silt loam; many coarse distinct yellowish red (5YR 4/6) mottles; moderate medium subangular blocky structure; friable; many fine, common medium, and few coarse roots; common fine and few medium tubular pores; neutral; clear wavy boundary.
Bt1—11 to 23 inches; dark reddish brown (2.5YR 3/4) silty clay loam; common fine distinct red (2.5YR 3/6) mottles; moderate medium subangular blocky structure; friable; common fine and few medium roots; common fine and medium tubular pores; few faint clay films on faces of peds; 5 percent gravel; common medium black concretions; medium acid; gradual wavy boundary.
Bt2—23 to 33 inches; dark red (2.5YR 3/6) silty clay loam; moderate fine and medium subangular blocky structure; firm; common fine and few medium roots; common fine and medium tubular pores; common prominent clay films on faces of peds; few manganese concentrations and common medium black concretions; medium acid; clear wavy boundary.
Bt3—33 to 43 inches; dark red (2.5YR 3/6) silty clay; moderate medium subangular blocky structure; firm; common fine and few medium roots; common fine and medium tubular pores; many prominent clay films lining pores and on faces of peds; few fine manganese concentrations and few fine black concretions; strongly acid; clear wavy boundary.
Bt4—43 to 65 inches; red (2.5YR 4/6) silty clay; moderate medium subangular blocky structure; firm; few fine roots; few fine and common medium tubular pores; many prominent clay films lining pores and on faces of peds; 3 percent fragments of chert; few fine manganese concentrations and few fine black concretions; strongly acid.

Thickness of the solum and depth to bedrock are more than 72 inches. The soils are medium acid or strongly acid in each horizon, but where limed the surface layer is less acid. Fragments of gravel and chert up to 3 inches in diameter range from none to 10 percent in all horizons.

The A horizon has hue of 5YR or 2.5YR, value of 3, and chroma of 2 to 4. It is silt loam or silty clay loam.

The BA horizon, where it occurs, has hue of 5YR or 2.5YR, value of 3, and chroma of 3 or 4. It is silt loam or silty clay loam.

The Bt horizon has hue of 2.5YR or 10R, value of

3, and chroma of 4 to 6. It is silty clay or clay, but in the upper part it is also silty clay loam.

Dewey Series

The Dewey series consists of very deep, well drained soils on uplands. These soils formed in residuum derived from limestone or in 1 to 2 feet of old alluvium and in the underlying residuum derived from limestone. Slopes range from 5 to 20 percent.

Dewey soils are near Decatur and Etowah soils. Decatur soils are on smoother topography and have a darker surface layer than Dewey soils. Etowah soils are on lower slopes and benches than Dewey soils. They are fine-loamy.

Typical pedon of Dewey silt loam, 5 to 12 percent slopes, eroded, 150 feet southeast of intersection of Old Andrew Johnson Highway and Odyssey Road:

Ap—0 to 7 inches; dark brown (7.5YR 4/4) silt loam; moderate medium granular structure; friable; many fine and medium roots; common fine tubular pores; neutral; clear smooth boundary.

BA—7 to 10 inches; dark reddish brown (5YR 3/4) silt loam; moderate fine subangular blocky structure; friable; many fine and medium roots; common fine and medium tubular pores; neutral; clear wavy boundary.

Bt1—10 to 27 inches; dark red (2.5YR 3/6) silty clay; moderate medium subangular blocky structure; firm; common fine and few medium roots; common fine and medium tubular pores; many distinct clay films on faces of peds; 2 percent fragments of chert up to 1/2 inch in diameter; few fine round black concretions 1/8 inch in size; strongly acid; gradual wavy boundary.

Bt2—27 to 34 inches; red (2.5YR 4/6) silty clay; few medium prominent strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; firm; few fine and medium roots; common fine and few medium tubular pores; many prominent clay films on faces of peds; 5 percent fragments of chert up to 1 inch in diameter; strongly acid; clear wavy boundary.

Bt3—34 to 48 inches; red (2.5YR 4/6) silty clay; common medium prominent strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure parting to strong medium and fine angular blocky; firm; few fine and medium roots; common fine and medium tubular pores; many prominent clay films on faces of peds; 5 percent fragments of chert up to 1 inch in diameter; strongly acid; clear wavy boundary.

Bt4—48 to 65 inches; red (2.5YR 4/6) silty clay; many medium prominent strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure parting to strong medium and fine angular blocky; firm; few fine and medium roots; common fine and medium tubular pores; many prominent clay films on faces of peds; 2 percent fragments of chert up to 1/2 inch in diameter; few fine black concretions; strongly acid.

Thickness of the solum and depth to bedrock are more than 60 inches. The soils are strongly acid or very strongly acid, but where limed the surface layer is less acid. Fragments of chert range from 0 to 15 percent in the upper 40 inches and 0 to 25 percent below a depth of 40 inches.

The Ap horizon has hue of 7.5YR or 5YR, value of 3 or 4, and chroma of 3 or 4. In some severely eroded areas, it has hue of 2.5YR and chroma of 6. It is silt loam or silty clay loam.

The BA horizon has hue of 5YR or 7.5YR, value of 3 or 4, and chroma of 4 to 6. It is silt loam or silty clay loam.

The Bt horizon has hue of 2.5YR or 5YR, value of 3 to 5, and chroma of 6 to 8. It has mottles in shades of yellow, brown, or red. It is silty clay or clay.

Dunmore Series

The Dunmore series consists of very deep, well drained soils. These soils formed in residuum derived from dolomitic limestone. They are on ridgetops and hillsides in dissected uplands. Slopes range from 2 to 40 percent.

Dunmore soils are near Fullerton, Tasso, and Minvale soils. Fullerton soils are in positions on the landscape similar to those of Dunmore soils and contain more than 15 percent fragments of chert in the B horizon. Tasso soils are on foot slopes and in depressions on uplands. They are moderately well drained and are fine-loamy. Minvale soils are on benches and foot slopes and are fine-loamy.

Typical pedon of Dunmore silt loam, 5 to 12 percent slopes, eroded, 0.2 mile northwest of Highway 66 on Briarwood Acres subdivision road, east of road; in a field:

Ap—0 to 6 inches; dark brown (10YR 4/3) silt loam; moderate medium granular structure; very friable; many fine and medium roots; common fine tubular pores; 10 percent fragments of chert up to 1/2 inch in diameter; slightly acid; abrupt smooth boundary.

Bt1—6 to 10 inches; yellowish red (5YR 5/6) silty clay

loam; common medium prominent yellowish brown (10YR 5/4) mottles; moderate fine subangular blocky structure; friable; common fine and medium roots; common fine and medium tubular pores; common distinct clay films on faces of peds; 10 percent fragments of chert up to 1/2 inch in diameter; slightly acid; clear smooth boundary.

Bt2—10 to 24 inches; yellowish red (5YR 5/6) silty clay; few fine prominent brownish yellow (10YR 6/8) and common medium faint strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; common fine and few medium roots; common fine and medium tubular pores; common distinct clay films on faces of peds; 5 percent fragments of chert up to 1/2 inch in diameter; strongly acid; clear wavy boundary.

Bt3—24 to 36 inches; yellowish red (5YR 5/6) clay; few fine prominent red (2.5YR 4/8) and common medium prominent brownish yellow (10YR 6/8) mottles; moderate coarse subangular blocky structure; very firm; common fine roots; many fine and common medium tubular pores; many distinct clay films on faces of peds; 2 percent fragments of chert up to 1/2 inch in diameter; strongly acid; clear wavy boundary.

Bt4—36 to 54 inches; yellowish red (5YR 5/6) clay; few fine faint strong brown (7.5YR 5/6) and common medium prominent brownish yellow (10YR 6/8) mottles; moderate medium subangular blocky structure; very firm; few fine roots; few fine and medium tubular pores; many prominent clay films on faces of peds; 2 percent fragments of chert up to 1/2 inch in diameter; strongly acid; gradual wavy boundary.

Bt5—54 to 65 inches; red (2.5YR 4/8) clay; few fine prominent strong brown (7.5YR 5/6) and common medium prominent yellowish red (5YR 5/6) and brownish yellow (10YR 6/8) mottles; strong fine and medium angular blocky structure; very firm; common fine and medium tubular pores; many prominent clay films on faces of peds; 2 percent fragments of chert up to 1/2 inch in diameter; strongly acid.

Thickness of the solum and depth to bedrock are more than 60 inches. The soils are strongly acid or very strongly acid, but where limed the surface layer is less acid. Fragments of chert range from 0 to 15 percent in each horizon.

The Ap horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 or 4. It is silt loam or silty clay loam.

Some pedons have a BA horizon, which has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8. This horizon is silt loam or silty clay loam.

The Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 to 8. It has mottles in shades of brown, yellow, and red. It is clay or silty clay, but in some pedons it is silty clay loam in the upper few inches.

Emory Series

The Emory series consists of very deep, well drained soils. These soils formed in local alluvium derived from soils on nearby slopes. They are in drainageways and in bottoms of sinkholes and depressions. Slope ranges from 0 to 3 percent.

Emory soils are near Dewey and Decatur soils. Dewey and Decatur soils are on adjacent uplands and have a clayey subsoil.

Typical pedon of Emory silt loam, rarely flooded, 0.4 mile south of Old Andrew Johnson Highway intersection on Odyssey Road, 100 yards east of road; in a depression:

Ap—0 to 7 inches; dark reddish brown (5YR 3/3) silt loam; moderate medium granular structure; very friable; many fine and common medium roots; common fine tubular pores; medium acid; clear smooth boundary.

Bw—7 to 21 inches; dark reddish brown (5YR 3/4) silt loam; weak medium and fine subangular blocky structure; firm; common fine and medium roots; common fine tubular pores; few fine manganese concentrations; medium acid; clear smooth boundary.

Ab—21 to 27 inches; dark reddish brown (5YR 3/4) silt loam; moderate medium granular structure; friable; many fine and common medium roots; common fine tubular pores; medium acid; clear smooth boundary.

Btb1—27 to 42 inches; reddish brown (5YR 4/4) silt loam; common fine distinct yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure; friable; common fine roots; common fine and few medium tubular pores; few faint clay films in pores; few fine manganese concentrations; medium acid; abrupt smooth boundary.

Btb2—42 to 52 inches; dark brown (7.5YR 4/4) silt loam; few fine distinct yellowish red (5YR 5/6) mottles; weak fine subangular blocky structure; friable; few fine roots; common fine tubular pores;

few distinct clay films on faces of peds and in pores; few fine black nodules and concentrations; medium acid; clear smooth boundary.

Btb3 52 to 65 inches; dark brown (7.5YR 4/4) silt loam; few fine distinct yellowish red (5YR 5/6) mottles; weak medium subangular blocky structure; friable; common fine and medium tubular pores; few distinct clay films on faces of peds and in pores; 2 percent fragments of chert; many fine and medium round black nodules; medium acid.

The local alluvium over the buried soil ranges from 20 to 36 inches in thickness. Depth to bedrock is more than 60 inches. The soils are medium acid or strongly acid, but where limed the surface layer is less acid. Coarse fragments, mainly chert, range from none to 10 percent in each horizon.

The Ap horizon has hue of 5YR, value of 3, and chroma of 2 to 4 or hue of 7.5YR, value of 3, and chroma of 2. It is silt loam or silty clay loam.

The Bw horizon has hue of 5YR, value of 3 to 5, and chroma of 3 or 4. It is silt loam or silty clay loam.

The Ab horizon has hue of 5YR, value of 3, and chroma of 2 to 4. It is silt loam or silty clay loam.

The Btb horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. It has no mottles or few or common mottles in shades of red, yellow, and brown. It is silty clay loam, clay loam, or, in some pedons, silty clay.

Ennis Series

The Ennis series consists of very deep, well drained soils. These soils formed in alluvium derived from soils underlain by limestone, shale, and sandstone. They are in drainageways and on narrow flood plains. Slopes range from 0 to 4 percent.

Ennis soils are near Lindside and Swafford soils. Lindside soils are in positions similar to those of Ennis soils on the landscape; they are moderately well drained and contain fewer fragments. Swafford soils are on low terraces, are moderately well drained, and are fragic in the subsoil.

Typical pedon of Ennis cobbly loam, occasionally flooded, near creek bank 200 feet south on Hensley Road, 200 feet west along Clear Creek:

Ap 0 to 8 inches; brown (10YR 4/3) cobbly loam; moderate medium granular structure; very friable; many fine and medium and common coarse roots; many very fine and common fine tubular pores; 20 percent sandstone gravel and cobbles up to 4 inches in diameter; strongly acid; clear smooth boundary.

Bw1 8 to 13 inches; yellowish brown (10YR 5/4) cobbly loam; weak medium subangular blocky structure; very friable; many fine and medium and common coarse roots; many very fine and common fine tubular pores; 15 percent sandstone gravel and cobbles up to 4 inches in diameter; very strongly acid; clear smooth boundary.

Bw2 13 to 20 inches; yellowish brown (10YR 5/6) cobbly loam; weak medium subangular blocky structure; friable; many fine and common medium and coarse roots; many very fine and common fine tubular pores; 20 percent sandstone cobbles up to 5 inches in diameter; very strongly acid; clear smooth boundary.

Bw3 20 to 30 inches; yellowish brown (10YR 5/6) cobbly loam; weak medium subangular blocky structure; friable; common fine and few medium and coarse roots; common fine and medium tubular pores; 30 percent sandstone cobbles and gravel up to 10 inches in diameter; very strongly acid; clear smooth boundary.

C1 30 to 40 inches; yellowish brown (10YR 5/6) very cobbly sandy loam; few fine distinct strong brown (7.5YR 5/6) mottles; massive; very friable; common fine and few medium and coarse roots; common very fine and fine tubular pores; 50 percent sandstone cobbles up to 10 inches in diameter; very strongly acid; gradual wavy boundary.

C2 40 to 60 inches; yellowish brown (10YR 5/6) very cobbly sandy loam; common fine distinct strong brown (7.5YR 5/6) mottles; massive; very friable; common fine roots; common very fine and fine tubular pores; 55 percent sandstone cobbles and gravel up to 10 inches in diameter; very strongly acid.

The solum ranges from 25 to 60 inches in thickness. Depth to bedrock is more than 60 inches. The soils are medium acid to very strongly acid, but where limed the surface layer is less acid. Cobbles and gravel range from 15 to 30 percent in the A and B horizons and up to 55 percent in the C horizon.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. It is cobbly loam.

The B horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 4 to 6. It is cobbly silt loam or cobbly loam.

The C horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 6. In the fine earth fraction it is loam or sandy loam.

Etowah Series

The Etowah series consists of very deep, well drained soils. These soils formed in old alluvium or colluvium. They are on intermediate terraces along the larger streams and on foot slopes adjacent to uplands. Slopes range from 2 to 25 percent.

Etowah soils are near Emory, Decatur, and Dewey soils. Decatur and Dewey soils are higher on the landscape than Etowah soils and have a clayey subsoil. Emory soils are in drainageways and in depressions. They formed in local alluvium over a buried soil.

Typical pedon of Etowah silt loam, 5 to 12 percent slopes, in Jefferson City, about 850 feet west of hospital, across railroad at south end of graded storage area:

Ap—0 to 10 inches; dark brown (7.5YR 3/2) silt loam; moderate medium granular structure; friable; many fine and medium and common coarse roots; 5 percent small fragments of chert; medium acid; abrupt smooth boundary.

Bt1—10 to 17 inches; yellowish red (5YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable; common fine and medium and few coarse roots; common fine tubular pores; few faint clay films on faces of peds; 5 percent small fragments of chert; common black concretions; strongly acid; clear smooth boundary.

Bt2—17 to 30 inches; red (2.5YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable; common fine and medium roots; common fine and medium tubular pores; common distinct clay films on faces of peds; 5 percent small fragments of chert; common black concretions and stains; strongly acid; clear smooth boundary.

Bt3—30 to 40 inches; red (2.5YR 4/6) silty clay loam; moderate medium subangular blocky structure; firm; few fine and medium roots; few medium tubular pores; common distinct clay films on faces of peds; 5 percent small fragments of chert; common black concretions and stains; strongly acid; clear smooth boundary.

Bt4—40 to 48 inches; red (2.5YR 4/8) silty clay loam; moderate medium subangular blocky structure; firm; few fine roots; few medium tubular pores; common distinct clay films on faces of peds; 5 percent small fragments of chert; few black concretions; strongly acid; clear smooth boundary.

Bt5—48 to 65 inches; red (2.5YR 4/6) silty clay loam; moderate medium subangular blocky structure; firm; few medium tubular pores; common distinct clay films on faces of peds; 5 percent fragments of chert; strongly acid.

The solum is more than 60 inches thick. Depth to bedrock is more than 72 inches. The soils are strongly acid or very strongly acid, but where limed the surface layer is less acid. Coarse fragments, mainly chert, range from none to 15 percent in each horizon.

The A horizon has hue of 7.5YR or 10YR, value of 3, and chroma of 2 to 4. It is silt loam or loam.

Some pedons have a BA horizon, which has hue of 7.5YR or 5YR, value of 4, and chroma of 4 to 6. This horizon is silt loam or loam.

The Bt horizon has hue of 7.5YR to 2.5YR, value of 4 or 5, and chroma of 6 to 8. In some pedons it has a few mottles in shades of brown or red. It is silty clay loam or clay loam.

Farragut Series

The Farragut series consists of deep, well drained soils. These soils formed in a thin layer of colluvium and in the underlying residuum derived from shale. They are on highly dissected uplands. Slopes range from 20 to 40 percent.

Farragut soils are near Dewey, Sequoia, and Dandridge soils. Dewey soils are on ridgetops and adjacent hillsides. They have a solum more than 60 inches thick. Sequoia soils are on adjacent hillsides. They are less than 40 inches deep to shale. Dandridge soils are on adjacent hillsides. They are less than 20 inches deep to shale.

Typical pedon of Farragut silt loam, 20 to 40 percent slopes, eroded, 0.25 mile south on farm road from intersection of Russell Gap Road and Highway 25W, 500 feet west of road; in woodland:

Ap—0 to 6 inches; dark reddish brown (5YR 3/4) silt loam; moderate medium granular structure; very friable; many fine and medium and common coarse roots; common fine and medium tubular pores; strongly acid; clear smooth boundary.

Bt1—6 to 11 inches; yellowish red (5YR 4/6) silty clay loam; moderate fine subangular blocky structure; friable; many fine, medium, and coarse roots; common fine and medium tubular pores; few faint clay films in pores; strongly acid; clear wavy boundary.

Bt2—11 to 19 inches; red (2.5YR 4/6) silty clay loam; weak medium subangular blocky structure parting to moderate fine subangular blocky; firm; many fine, medium, and coarse roots; many fine and few medium tubular pores; common distinct clay films on faces of peds; 5 percent fragments of shale up to 2 inches in diameter; very strongly acid; clear wavy boundary.

Bt3—19 to 38 inches; red (2.5YR 4/6) silty clay; few medium prominent yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; firm; many fine, medium, and coarse roots; many very fine and common fine tubular pores; common distinct clay films on faces of peds; 5 percent fragments of shale up to 2 inches in diameter; very strongly acid; gradual wavy boundary.

BC—38 to 51 inches; red (2.5YR 4/6) silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; common fine and medium roots; common fine tubular pores; few distinct clay films on faces of peds; 10 percent fragments of shale up to 3 inches in diameter; very strongly acid; gradual wavy boundary.

C—51 to 65 inches; red (2.5YR 4/6) channery silty clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; massive; friable; few fine and medium roots; common fine tubular pores; 30 percent fragments of shale up to 3 inches in diameter; very strongly acid.

The solum ranges from 40 to 55 inches in thickness. Depth to bedrock ranges from 48 to 70 inches or more. The soils are strongly acid or very strongly acid, but where limed the surface layer is less acid. Rock fragments range from 0 to 10 percent in the solum and from 15 to 35 percent in the C horizon.

The Ap horizon has hue of 5YR, value of 3, and chroma of 3 or 4. It is silt loam.

The Bt horizon has hue of 5YR or 2.5YR, value of 3 or 4, and chroma of 6. It is silty clay loam, silty clay, or clay. It is mottled in shades of brown and red.

The BC and C horizons have hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6. They are mottled in shades of brown, yellow, or red. In the fine earth fraction they are silty clay loam or silty clay.

Fullerton Series

The Fullerton series consists of very deep, well drained soils. These soils formed in residuum derived from cherty dolomite. They are on dissected uplands that have rolling ridgetops and steep hillsides. Slopes range from 5 to 45 percent.

Fullerton soils are near Dunmore and Minvale soils. Dunmore soils are in positions similar to those of Fullterton soils and contain less than 15 percent chert. Minvale soils are on foot slopes and are fine-loamy.

Typical pedon of Fullerton gravelly silt loam, 5 to 12 percent slopes, eroded, near Griffy Road, 800 feet north of Nance's Ferry Road, 2,200 feet from the Holston River:

Ap—0 to 8 inches; brown (10YR 4/3) gravelly silt loam; moderate medium granular structure; very friable; many fine roots; 20 percent fragments of chert ranging from 0.1 inch to 2 inches in diameter; strongly acid; abrupt smooth boundary.

Bt1—8 to 17 inches; strong brown (7.5YR 5/6) gravelly silty clay loam; weak fine subangular blocky structure; friable; common fine roots; few fine and medium tubular pores; few faint clay films on faces of peds; 20 percent fragments of chert ranging from 0.1 inch to 2 inches in diameter; very strongly acid; abrupt wavy boundary.

Bt2—17 to 25 inches; yellowish red (5YR 5/8) gravelly clay; moderate fine angular blocky structure; firm; few fine roots; few fine and medium tubular pores; common distinct clay films on faces of peds; 20 percent fragments of chert ranging from 0.1 inch to 2 inches in diameter; very strongly acid; clear wavy boundary.

Bt3—25 to 45 inches; red (2.5YR 5/6) gravelly clay; moderate fine angular blocky structure; firm; very few fine roots; few fine and medium tubular pores; many distinct clay films on faces of peds; 15 percent fragments of chert ranging from 0.1 inch to 3 inches in diameter; some fragments of chert weathered to crushable fragments; very strongly acid; gradual smooth boundary.

Bt4—45 to 65 inches; yellowish red (5YR 5/8) gravelly clay; strong medium angular blocky structure; firm; few fine tubular pores; many distinct clay films on faces of peds; 30 percent fragments of chert ranging from 0.1 inch to 6 inches in diameter; very strongly acid; gradual wavy boundary.

Thickness of the solum and depth to bedrock are more than 60 inches. In unlimed areas the soils are strongly acid or very strongly acid. Fragments of chert range from 15 to 35 percent in each horizon.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. Some pedons have a thin A horizon, which has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The Ap or A horizon is gravelly silt loam or gravelly loam.

Some pedons have an E horizon, which has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. This horizon is gravelly silt loam or gravelly loam.

The Bt horizon has hue of 7.5YR to 2.5YR, value of 4 or 5, and chroma of 6 to 8. It is gravelly silty clay or gravelly clay, but in some pedons the upper part is gravelly silty clay loam.

Gilpin Series

The Gilpin series consists of moderately deep, well drained soils. These soils formed in residuum derived from acid shale and siltstone. They are on highly dissected uplands. Slopes range from 12 to 70 percent.

Gilpin soils are near Armuchee, Muse, Muskingum, and Sequoia soils. Armuchee and Sequoia soils are clayey. They are in positions similar to those of Gilpin soils. Muse soils are more than 40 inches deep over shale. Muskingum soils do not have an argillic horizon.

Typical pedon of Gilpin channery silt loam, 25 to 70 percent slopes, 1.3 miles southeast of Rex Thornton Road on trail, 500 feet east of road, on side of English Mountain:

Oi—4 to 2 inches; hardwood leaf litter

Oe—2 inches to 0; partly decomposed leaf litter

A—0 to 6 inches; brown (10YR 4/3) channery silt loam; moderate medium granular structure; very friable; many fine, medium, and coarse roots; many fine and common medium tubular pores; 20 percent fragments of shale up to 2 inches in diameter; strongly acid; abrupt smooth boundary.

BE—6 to 11 inches; yellowish brown (10YR 5/6) silt loam; moderate fine subangular blocky structure; very friable; common fine and medium and few coarse roots; many fine and common medium tubular pores; 10 percent fragments of shale up to 2 inches in diameter; strongly acid; clear smooth boundary.

Bt1—11 to 16 inches; strong brown (7.5YR 5/6) silt loam; weak medium subangular blocky structure; friable; common fine and medium and few coarse roots; many fine and common medium tubular pores; few distinct clay films on faces of peds and in pores; 10 percent fragments of shale up to 2 inches in diameter; strongly acid; clear smooth boundary.

Bt2—16 to 26 inches; strong brown (7.5YR 4/6) channery silt loam; moderate fine and medium subangular blocky structure; friable; common fine and medium and few coarse roots; common fine and medium tubular pores; few distinct clay films on faces of peds and in pores; 20 percent fragments of shale up to 3 inches in diameter; strongly acid; gradual wavy boundary.

Bt3—26 to 32 inches; strong brown (7.5YR 4/6) very channery silty clay loam; moderate fine subangular blocky structure; friable; common fine and medium roots; few fine and medium tubular pores; few distinct clay films on faces of peds and in pores; 40 percent fragments of shale up to 3 inches in diameter; strongly acid; clear wavy boundary.

Cr—32 to 45 inches; soft, weathered, acid shale.

The solum ranges from 18 to 36 inches in thickness. Depth to soft shale ranges from 20 to 40 inches. The soils are strongly acid or very strongly acid, but where limed the surface layer is less acid. Fragments of shale and siltstone range from 5 to 40 percent in individual horizons of the solum and from 40 to 80 percent in the C horizon.

The A or Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. Some pedons have an E horizon, which has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. In the fine earth fraction the A, Ap, and E horizons are silt loam or loam.

The BE horizon has hue of 10YR, value of 4 or 5, and chroma of 4 to 6. In the fine earth fraction it is silt loam or loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 8. In the fine earth fraction it is silt loam or silty clay loam.

Some pedons have a C horizon. This horizon has hue of 10YR or 2.5YR, value of 4 or 5, and chroma of 3 to 6. In the fine earth fraction it is silt loam or silty clay loam.

Lindside Series

The Lindside series consists of very deep, moderately well drained soils. These soils formed in alluvium on flood plains. Slopes range from 0 to 3 percent.

Lindside soils are near Nolin, Staser, Newark, and Beason soils. Nolin and Staser soils are on flood plains and are well drained. Newark soils are on adjacent flood plains and are somewhat poorly drained. Beason soils are on low terraces and have an argillic horizon.

Typical pedon of Lindside silt loam, occasionally flooded, 0.5 mile east of Nance Road on Highway 11E, 100 feet north of road; in a pastured area:

Ap—0 to 10 inches; dark brown (10YR 4/3) silt loam; moderate medium granular structure; very friable; common fine and medium roots; few fine and medium tubular pores; neutral; clear wavy boundary.

Bw1—10 to 22 inches; brown (7.5YR 4/4) silt loam; common medium distinct yellowish brown (10YR 5/4) mottles; weak fine subangular blocky structure; very friable; common fine and medium roots; few fine and common medium tubular pores; neutral; clear wavy boundary.

Bw2—22 to 32 inches; brown (10YR 4/3) silt loam; few medium distinct strong brown (7.5YR 4/6) and common medium faint grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; very friable; few fine and common medium roots; common fine tubular pores; many fine irregular black manganese concentrations; neutral; clear smooth boundary.

Bw3—32 to 46 inches; brown (10YR 4/3) silt loam; common medium distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; very friable; few fine tubular pores; common fine black manganese concentrations; neutral; clear wavy boundary.

C—46 to 60 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct grayish brown (10YR 5/2) and few fine distinct strong brown (7.5YR 4/6) mottles; massive; friable; few fine tubular pores; few fine black manganese concentrations; neutral.

The solum ranges from 25 to 50 inches in thickness. Depth to bedrock is more than 60 inches. The soils are slightly acid or neutral. Rock fragments range from 0 to 5 percent within a depth of 40 inches and from 0 to 30 percent below a depth of 40 inches.

The Ap horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 3. It is silt loam.

The Bw horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 or 4. It is mottled in shades of gray or brown. Depth to mottles with chroma of 2 or less ranges from 14 to 24 inches. The horizon is silt loam.

The C horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 4. It is mottled in shades of gray or brown. In the fine earth fraction it is silt loam, silty clay loam, or, in a few pedons, loam.

Minvale Series

The Minvale series consists of very deep, well drained soils at the base of slopes. These soils formed in cherty colluvium and residuum derived from dolomitic limestone. They are on benches and foot slopes. Slopes range from 5 to 15 percent.

Minvale soils are near Fullerton and Dunmore soils, which are on adjacent uplands and have a clayey subsoil.

Typical pedon of Minvale gravelly silt loam, 5 to 15 percent slopes, 0.3 mile west of Highway 92 on Cline Road, 300 yards south of road; in woodland:

Oi—1 inch to 0; hardwood leaf litter.

A—0 to 2 inches; dark brown (10YR 4/3) gravelly silt loam; moderate medium granular structure; very friable; many fine and medium roots; few fine pores; 20 percent chert fragments up to 4 inches in diameter; strongly acid; abrupt wavy boundary.

E—2 to 9 inches; yellowish brown (10YR 5/4) gravelly silt loam; weak fine and medium granular structure; very friable; many fine and medium roots; few fine and medium pores; 25 percent chert fragments up to 2 inches in diameter; strongly acid; clear wavy boundary.

Bt1—9 to 21 inches; strong brown (7.5YR 5/6) gravelly silt loam; common fine faint brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; friable; common fine and medium roots; few fine and medium tubular pores; few faint clay films on faces of peds and in pores; 30 percent fragments of chert up to 3 inches in diameter; few fine black concentrations of manganese; strongly acid; clear wavy boundary.

Bt2—21 to 28 inches; strong brown (7.5YR 5/6) gravelly silty clay loam; common medium distinct brownish yellow (10YR 6/6) and common fine prominent yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure; friable; common fine and medium roots; common fine tubular pores; many distinct clay films on faces of peds; 30 percent fragments of chert up to 3 inches in diameter; few fine black concentrations of manganese; strongly acid; clear smooth boundary.

Bt3—28 to 42 inches; red (2.5YR 4/8) gravelly silty clay loam; common fine prominent strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; few fine and medium roots; common fine and few medium tubular pores; many distinct clay films on faces of peds; 35 percent fragments of chert up to 3 inches in diameter; common fine concretions and few fine black concentrations of manganese; strongly acid; clear wavy boundary.

Bt4—42 to 65 inches; red (2.5YR 4/6) gravelly silty clay; moderate medium subangular blocky structure; firm; few fine roots; many distinct clay films on faces of peds; 35 percent fragments of chert up to 3 inches in diameter; strongly acid.

Thickness of the solum and depth to bedrock are more than 60 inches. The soils are strongly acid or very strongly acid, but where limed the surface layer is less acid. Fragments of chert range from 20 to 35 percent in each horizon.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. It is gravelly silt loam or gravelly loam.

The E horizon, where it occurs, has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 2 to 4. It is gravelly silt loam or gravelly loam.

The Bt horizon has hue of 7.5YR to 2.5YR, value of 4 or 5, and chroma of 4 to 8. In the fine earth fraction it is silt loam or silty clay loam in the upper part and silty clay loam or clay in the lower part. It has mottles in shades of yellow, brown, and red. In some pedons the lower part is mottled in shades of gray.

Montevallo Series

The Montevallo series consists of shallow, well drained soils. These soils formed in material derived from silty shale or siltstone. They are on low, rolling hills on uplands. Slopes range from 2 to 50 percent.

Montevallo soils are near Armuchee soils. Armuchee soils are in positions similar to those of Montevallo soils. Armuchee soils have a clayey subsoil and contain fewer fragments of shale.

Typical pedon of Montevallo channery silt loam, 2 to 10 percent slopes, 500 feet west of Ault Lake, in Rocky Valley Community; in a pastured area:

Ap1—0 to 3 inches; dark brown (10YR 3/3) channery silt loam; moderate fine and medium granular structure; very friable; common fine roots; few fine tubular pores; 20 percent fragments of shale up to 1 inch in diameter; medium acid; abrupt smooth boundary.

Ap2—3 to 8 inches; brown (10YR 4/3) channery silt loam; moderate fine and medium granular structure; very friable; common fine roots; few fine tubular pores; 20 percent fragments of shale up to 1 inch in diameter; medium acid; abrupt smooth boundary.

Bw1—8 to 12 inches; yellowish brown (10YR 5/6) very channery silt loam; weak fine and medium subangular blocky structure; very friable; few fine roots; few fine tubular pores; 40 percent fragments of shale up to 1 inch in diameter; medium acid; abrupt wavy boundary.

Bw2—12 to 16 inches; yellowish brown (10YR 5/4) extremely channery silt loam; weak fine subangular blocky structure; very friable; few very fine tubular pores; 80 percent fragments of shale up to 3 inches in diameter; medium acid; abrupt wavy boundary.

Cr—16 to 38 inches; soft, thin-bedded, acid shale.

Thickness of the solum and depth to bedrock range from 10 to 20 inches. Reaction is medium acid to very strongly acid, but where limed the surface layer is less acid. Fragments of shale, by volume, range from 15 to 35 percent in the A horizon and from 35 to 80 percent in the B horizon.

The A or Ap horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 to 4. In the fine earth fraction it is silt loam.

The Bw horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. In the fine earth fraction it is silt loam, loam, or silty clay loam.

Muse Series

The Muse series consists of deep, well drained soils. These soils formed in colluvium and residuum derived from acid shale. They are on foot slopes and benches. Slopes range from 2 to 12 percent.

Muse soils are near Sequoia, Dandridge, and Whitesburg soils. Sequoia and Dandridge soils are on the higher slopes. Sequoia soils are less than 40 inches deep to bedrock. Dandridge soils are less than 20 inches deep to bedrock. Whitesburg soils are on narrow flood plains and do not have an argillic horizon.

Typical pedon of Muse silt loam, 5 to 12 percent slopes, 0.5 mile east of Bluff Road, on south side of Beaver Creek Road:

Ap—0 to 9 inches; dark brown (10YR 4/3) silt loam; moderate medium granular structure; very friable; many fine and medium roots; few fine tubular pores; 5 percent fragments of shale up to 1 inch in diameter; few fine dark reddish brown concretions; medium acid; clear smooth boundary.

Bt1—9 to 16 inches; brown (7.5YR 5/4) silty clay loam; common medium distinct strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; friable; common fine and medium roots; common fine and few medium tubular pores; 5 percent fragments of shale up to 1 inch in diameter; few fine dark reddish brown concretions; very strongly acid; clear smooth boundary.

Bt2—16 to 31 inches; strong brown (7.5YR 5/6) silty clay; common fine prominent yellowish red (5YR 5/8) and few fine distinct brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; firm; common fine and few medium roots; common fine tubular pores; common distinct clay films on faces of peds; 5 percent fragments of shale up to 1 inch in diameter; few fine dark reddish brown concretions; very strongly acid; clear smooth boundary.

Bt3—31 to 44 inches; yellowish red (5YR 5/6) silty clay; common fine faint brownish yellow (10YR 6/6) mottles; weak medium subangular blocky structure; firm; common fine and medium roots; common fine and few medium tubular pores;

common distinct clay films on faces of peds; 10 percent fragments of shale up to 2 inches in diameter; very strongly acid; clear smooth boundary.

Bt4—44 to 54 inches; yellowish red (5YR 5/6) channery silty clay; many medium prominent light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; firm; few medium roots; few fine tubular pores; common distinct clay films on faces of peds; 30 percent fragments of shale; very strongly acid; clear wavy boundary.

C—54 to 60 inches; yellowish red (5YR 5/6) very channery silty clay; many medium prominent light yellowish brown (10YR 6/4) and light olive brown (2.5Y 5/4) mottles; massive; 50 percent fragments of weathered shale up to 2 inches in diameter; very strongly acid; abrupt wavy boundary.

Cr—60 to 68 inches; light olive brown (2.5Y 5/4) clayey shale that is less than 5 percent fines in fractures.

The solum ranges from 40 to 60 inches in thickness. Depth to bedrock ranges from 40 to 80 inches. Reaction is strongly acid or very strongly acid, but where limed the surface layer is less acid. Fragments of shale range from 5 to 35 percent in the solum and from 25 to 60 percent in the C horizon.

The A or Ap horizon has hue of 10YR, value of 4 or 5, and chroma 2 to 4. Some pedons have an E horizon, which has hue of 10YR, value of 5, and chroma of 3 or 4. In the fine earth fraction the A, Ap, and E horizons are silt loam.

The Bt horizon has hue of 10YR, 7.5YR, or 5YR, value of 4 or 5, and chroma of 6 to 8. It has mottles in shades of brown, yellow, and red. In the fine earth fraction it is silty clay loam or silty clay.

The C horizon has the same colors and textures as those in the Bt horizon.

Muskingum Series

The Muskingum series consists of moderately deep, well drained soils. These soils formed in materials derived from shale, sandstone, and siltstone. They are on the side slopes of highly dissected uplands. Slopes range from 25 to 50 percent.

Muskingum soils are near Gilpin, Armuchee, Muse, and Dandridge soils. Gilpin soils have an argillic horizon. Armuchee and Muse soils have a clayey subsoil. Dandridge soils are clayey-skeletal and are less than 20 inches deep to calcareous shale.

Typical pedon of Muskingum silt loam, 25 to 50 percent slopes, on Highway 92 north to first road on the right past Dumplin Valley Road, 0.3 mile northeast, 50 feet south; in woodland:

Oe—1/2 inch to 0; partly decomposed hardwood leaf litter.

A1—0 to 1 inch; very dark grayish brown (10YR 3/2) silt loam; moderate fine granular structure; very friable; many fine and medium roots; common fine tubular pores; 5 percent fragments of siltstone up to 1 inch in diameter; medium acid; abrupt smooth boundary.

A2—1 to 3 inches; brown (10YR 4/3) silt loam; moderate medium granular structure; very friable; common fine and medium and few coarse roots; common fine tubular pores; 5 percent fragments of siltstone up to 1 inch in diameter; strongly acid; clear wavy boundary.

E—3 to 8 inches; yellowish brown (10YR 5/4) silt loam; weak fine and medium granular structure; very friable; common fine and medium roots; common fine tubular pores; 12 percent fragments of siltstone up to 1 inch in diameter; very strongly acid; gradual wavy boundary.

Bw1—8 to 15 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; common fine and medium roots; few fine and medium tubular pores; 10 percent fragments of siltstone up to 1 inch in diameter; few fine black concentrations on faces of peds and on fragments; very strongly acid; clear wavy boundary.

Bw2—15 to 30 inches; strong brown (7.5YR 5/6) silt loam; moderate medium subangular blocky structure; friable; common fine and medium roots; few fine and medium tubular pores; 10 percent fragments of siltstone and shale up to 2 inches in diameter; very strongly acid; clear wavy boundary.

Cr—30 to 45 inches; weathered shale and siltstone.

Thickness of the solum and depth to rippable bedrock range from 20 to 40 inches. The soils are strongly acid or very strongly acid. Fragments of shale, siltstone, and sandstone make up 5 to 15 percent of the A and E horizons, 10 to 30 percent of the Bw horizon, and, where the C horizon occurs, 35 to 60 percent of the C horizon.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The E horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. The A and E horizons are silt loam.

The Bw horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. In the fine earth fraction it is silt loam or loam.

Some pedons have a thin C horizon, which, in the fine earth fraction, has colors and textures similar to those of the Bw horizon.

Newark Series

The Newark series consists of very deep, somewhat poorly drained soils. These soils formed in mixed alluvium on flood plains. Slopes range from 0 to 2 percent.

Newark soils are near Beason and Lindside soils. Beason soils are on low stream terraces and have an argillic horizon. Lindside soils are on flood plains and are moderately well drained.

Typical pedon of Newark silt loam, frequently flooded, 0.8 mile east on Russell Gap Road from its intersection with Rock Valley Road, 100 feet southwest of road; in pasture:

Ap—0 to 6 inches; brown (10YR 4/3) silt loam; moderate medium granular structure; very friable; many fine and medium roots; common fine tubular pores; mildly alkaline; abrupt smooth boundary.

Bw—6 to 19 inches; yellowish brown (10YR 5/4) silt loam; many medium distinct strong brown (7.5YR 5/6) and light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable; common fine and medium roots; few fine medium tubular pores; many medium iron and manganese concentrations; mildly alkaline; clear wavy boundary.

Bg—19 to 30 inches; light brownish gray (10YR 6/2) silt loam; many medium distinct strong brown (7.5YR 5/6) and pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable; few fine and medium roots; few fine tubular pores; many medium iron and manganese concentrations; mildly alkaline; clear wavy boundary.

Cg—30 to 65 inches; light brownish gray (10YR 6/2) silt loam; many fine distinct strong brown (7.5YR 5/6) and common fine faint pale brown (10YR 6/3) mottles; massive; friable; few fine tubular pores; many coarse iron and manganese concentrations; neutral.

The solum ranges from 22 to 44 inches in thickness. Depth to bedrock is more than 60 inches. Reaction ranges from medium acid to mildly alkaline. Gravel ranges from 0 to 5 percent within a depth of 30 inches and 0 to 15 percent below that depth.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is silt loam.

The Bw horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. It has few to many mottles in shades of gray and brown. It is silt loam or silty clay loam.

The Bg horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2, or it is neutral. It has few to many mottles in shades of brown. It is silt loam or silty clay loam.

The Cg horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2, or it is neutral. It has few to many mottles in shades of brown. It is silt loam or light silty clay loam.

Nolichucky Series

The Nolichucky series consists of very deep, well drained soils. These soils formed in old alluvium on high stream terraces. Slopes range from 2 to 20 percent.

Nolichucky soils are near Sequoia, Swafford, and Waynesboro soils. Sequoia soils are on adjacent shale knobs and are less than 40 inches deep to shale. Swafford soils are on adjacent low terraces and are moderately well drained. Waynesboro soils have a clayey subsoil. They are in positions similar to those of Nolichucky soils.

Typical pedon of Nolichucky loam, 2 to 5 percent slopes, eroded, 0.1 mile southwest of sharp bend in Loy Road, on gravel driveway, 70 feet north of driveway; in hayland:

Ap—0 to 8 inches; brown (10YR 4/3) loam; moderate medium granular structure; very friable; many fine and medium roots; common very fine tubular pores; 5 percent fine gravel; neutral; abrupt wavy boundary.

Bt1—8 to 15 inches; strong brown (7.5YR 5/6) loam; weak medium subangular blocky structure; friable; common fine and medium roots; common fine and few medium tubular pores; few faint clay films on faces of peds; few fine pebbles; neutral; clear wavy boundary.

Bt2—15 to 23 inches; yellowish red (5YR 5/8) clay loam; moderate medium subangular blocky structure; friable; common fine and medium roots; common fine and few medium tubular pores; few distinct clay films on faces of peds; few fine pebbles; strongly acid; clear wavy boundary.

Bt3—23 to 36 inches; red (2.5YR 4/6) clay loam; strong medium subangular blocky structure; friable; common fine and few medium roots; few fine and common medium tubular pores; many distinct clay films on faces of peds; few fine pebbles; few medium black concentrations lining old root channels; strongly acid; clear wavy boundary.

Bt4—36 to 45 inches; red (2.5YR 4/6) clay loam; moderate medium subangular blocky structure; friable; few fine roots; few fine tubular pores; common distinct clay films on faces of peds; few

fine pebbles; very strongly acid; clear wavy boundary.

Bt5—45 to 60 inches; yellowish red (2.5YR 4/8) clay loam; weak medium and coarse subangular blocky structure; friable; few fine tubular pores; few distinct clay films on faces of peds; few fine pebbles; very strongly acid.

Thickness of the solum and depth to bedrock are more than 60 inches. The soils are strongly acid or very strongly acid, but where limed the surface layer and the upper part of the subsoil are less acid. Gravel ranges from 0 to 25 percent in the Ap horizon and from 0 to 15 percent in the Bt horizon.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. In the fine earth fraction it is loam or sandy loam.

The Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8. It is clay loam, but in some pedons the lower part ranges to clay.

Nolin Series

The Nolin series consists of very deep, well drained soils. These soils formed in alluvium on flood plains. Slopes range from 0 to 3 percent.

Nolin soils are near Etowah, Lindside, Newark, and Muse soils. Etowah and Muse soils are on adjacent foot slopes and have an argillic horizon. Lindside soils are in positions similar to those of Nolin soils. They are moderately well drained. Newark soils are in lower areas and are somewhat poorly drained.

Typical pedon of Nolin silt loam, occasionally flooded, along Long Creek, 0.9 mile east of Highway 25E, 30 feet north of creek; in pasture:

Ap—0 to 7 inches; dark brown (10YR 4/3) silt loam; moderate fine and medium granular structure; very friable; many fine roots; few fine tubular pores; few fine pebbles; slightly acid; abrupt smooth boundary.

Bw1—7 to 16 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine and weak medium subangular blocky structure; very friable; common fine and medium roots; common fine tubular pores; slightly acid; clear smooth boundary.

Bw2—16 to 30 inches; dark yellowish brown (10YR 4/4) silt loam; common fine faint yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; friable; common fine and few medium roots; common fine tubular pores; slightly acid; clear wavy boundary.

Ab—30 to 36 inches; dark brown (10YR 4/3) silt loam; common medium faint dark yellowish brown (10YR 4/4) mottles; moderate medium granular and fine subangular blocky structure; friable; common fine and few medium roots; few fine tubular pores; common wormcasts; neutral; clear wavy boundary.

Bwb1—36 to 48 inches; dark brown (10YR 4/3) silt loam; common medium faint dark grayish brown (10YR 4/2) and dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable; common fine roots; common fine tubular pores; neutral; gradual wavy boundary.

Bwb2—48 to 60 inches; dark brown (10YR 4/3) silt loam; few fine distinct light brownish gray (10YR 6/2) and few fine faint dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine tubular pores; few fine manganese concentrations; neutral.

The solum is more than 40 inches thick. Depth to bedrock is more than 60 inches. The soils are medium acid to moderately alkaline. Coarse fragments range from 0 to 5 percent in each horizon.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. It is silt loam.

The Bw horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4. It is silt loam. In some pedons it has common mottles in shades of brown.

The Ab horizon has hue of 10YR, value of 3 or 4, and chroma of 3. It is silt loam. It has mottles in shades of brown.

The Bwb horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. It is silt loam or silty clay loam. It has no mottles or few or common mottles in shades of brown and gray.

Purdy Series

The Purdy series consists of very deep, poorly drained soils. These soils formed in clayey, slack-water deposits. They are on terraces and in depressions on uplands. Slopes range from 0 to 2 percent.

Purdy soils are near Beason and Newark soils. Beason soils are somewhat poorly drained and are in slightly higher positions than those of Purdy soils. Newark soils are on bottom lands and do not have an argillic horizon.

Typical pedon of Purdy silt loam, from the intersection of Old Airport and Leadvale Roads, 0.2 mile on Old Airport Road, 100 feet into woodland:

Oi—1/2 inch to 0; hardwood leaf litter.

A1—0 to 3 inches; dark grayish brown (10YR 4/2) silt loam; moderate medium granular structure; very

friable; many fine and medium and few coarse roots; few fine tubular pores; strongly acid; abrupt smooth boundary.

A2—3 to 5 inches; grayish brown (10YR 5/2) silt loam; weak medium granular structure; friable; common fine and medium and few coarse roots; few very fine and fine tubular pores; strongly acid; abrupt wavy boundary.

BA—5 to 12 inches; grayish brown (2.5Y 5/2) silt loam; many medium prominent yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; common fine and few medium and coarse roots; few very fine and fine tubular pores; strongly acid; clear smooth boundary.

Btg1—12 to 22 inches; grayish brown (2.5Y 5/2) silty clay loam; many medium prominent yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; firm; common fine and few medium and coarse roots; few fine and medium tubular pores; few distinct clay films on faces of peds; strongly acid; clear wavy boundary.

Btg2—22 to 32 inches; grayish brown (2.5Y 5/2) silty clay; many medium distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; common fine roots; few fine tubular pores; common distinct clay films on faces of peds; strongly acid; clear wavy boundary.

Btg3—32 to 50 inches; grayish brown (2.5Y 5/2) clay; many medium prominent yellowish brown (10YR 5/8) mottles; moderate medium and weak coarse subangular blocky structure; firm; few fine roots; few fine and medium tubular pores; many distinct clay films on faces of peds; strongly acid; clear wavy boundary.

Cg—50 to 65 inches; light brownish gray (2.5Y 6/2) silty clay; few fine prominent yellowish brown (10YR 5/8) mottles; massive; very firm; common very fine and few fine tubular pores; neutral.

The solum ranges from 30 to 50 inches in thickness. Depth to bedrock is more than 60 inches. The soils are strongly acid in the A and B horizons and slightly acid or neutral in the C horizon.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. It is silt loam.

The BA horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2. It has mottles in shades of brown. It is silt loam.

The Btg horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2, or it is neutral. It has mottles in shades of brown or gray. It is silty clay loam, silty clay, or clay.

The Cg horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2, or it is neutral. It has mottles in shades of brown. It is silty clay or clay.

Ramsey Series

The Ramsey series consists of shallow, somewhat excessively drained soils. These soils formed in residuum and colluvium derived from sandstone. They are on the tops and the upper side slopes of mountains. Slopes range from 12 to 70 percent.

Ramsey soils are near Muskingum and Gilpin soils. Muskingum and Gilpin soils are in positions similar to those of Ramsey soils. Muskingum and Gilpin soils both are higher in silt content than Ramsey soils. They are 20 to 40 inches deep to bedrock.

Typical pedon of Ramsey loam, in an area of Ramsey-Rock outcrop complex, 25 to 70 percent slopes, 0.6 mile north of lower Rhinehart Road from Highway 411, about 750 feet northeast of road; in woodland:

Oi—2 inches to 1 inch; hardwood leaf litter.

Oe—1 inch to 0; partly decomposed hardwood leaf litter.

A—0 to 1 inch; very dark grayish brown (10YR 3/2) loam; weak medium granular structure; very friable; common fine, medium, and coarse roots; common fine tubular pores; 5 percent fragments of sandstone up to 1 inch in diameter; very strongly acid; abrupt smooth boundary.

E—1 to 4 inches; brown (10YR 4/3) loam; weak fine and medium granular structure; very friable; common fine, medium, and coarse roots; common fine tubular pores; 5 percent fragments of sandstone up to 1 inch in diameter; very strongly acid; clear smooth boundary.

Bw1—4 to 10 inches; brown (10YR 5/3) loam; weak fine and medium subangular blocky structure; very friable; common fine and medium and few coarse roots; common fine and medium tubular pores; 5 percent fragments of sandstone up to 1 inch in diameter; very strongly acid; clear wavy boundary.

Bw2—10 to 18 inches; yellowish brown (10YR 5/6) loam; weak medium subangular blocky structure; very friable; common fine and medium roots; common fine and medium tubular pores; 13 percent fragments of sandstone up to 2 inches in diameter; strongly acid; clear wavy boundary.

R—18 inches; hard sandstone.

Thickness of the solum and depth to sandstone bedrock range from 7 to 20 inches. The soils are

strongly acid or very strongly acid. Fragments of sandstone range from 0 to 15 percent in the A and E horizons and from 5 to 35 percent in the Bw and C horizons.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is loam or sandy loam.

The Bw horizon has hue of 10YR, value of 4 or 5, and chroma of 3 to 6. In the fine earth fraction it is loam or sandy loam.

Some pedons have a BC or C horizon, which has colors similar to those of the Bw horizon. In the fine earth fraction the BC or C horizon ranges from loam to loamy sand.

Sequoia Series

The Sequoia series consists of moderately deep, well drained soils. These soils formed in residuum derived from acid shale. They are on moderately dissected uplands. Slopes range from 2 to 20 percent.

Sequoia soils are near Armuchee, Dandridge, Gilpin, and Muse soils. Armuchee, Dandridge, and Gilpin soils are on adjacent hillsides. Armuchee soils have an argillic horizon less than 10 inches thick. Dandridge soils are less than 20 inches deep to calcareous shale. Gilpin soils have a loamy subsoil. Muse soils are on foot slopes and are more than 40 inches deep to bedrock.

Typical pedon of Sequoia silt loam, 2 to 5 percent slopes, eroded, 0.1 mile south of Cook Mill Road on Bailey School Road, 200 yards northeast of road; in pasture:

Ap—0 to 5 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium granular structure; very friable; many fine and medium roots; common fine and few medium tubular pores; slightly acid; abrupt smooth boundary.

Bt1—5 to 10 inches; dark yellowish brown (10YR 4/4) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; many fine and common medium roots; common fine and medium tubular pores; 5 percent fragments of shale up to 1/2 inch in diameter; slightly acid; abrupt smooth boundary.

Bt2—10 to 29 inches; strong brown (7.5YR 5/8) silty clay; few medium distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; common fine roots; common fine tubular pores; common distinct clay films on faces of peds; 10 percent fragments of shale up to 1/2 inch in diameter; strongly acid; clear wavy boundary.

BC—29 to 35 inches; strong brown (7.5YR 5/6) silty clay loam; common medium prominent dark red (2.5YR 3/6) and common medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; firm; few fine roots; common fine tubular pores; 15 percent fragments of shale up to 1/2 inch in diameter; strongly acid; abrupt wavy boundary.

Cr—35 to 50 inches; soft, acid shale.

Thickness of the solum and depth to soft shale range from 20 to 40 inches. The soils are strongly acid or very strongly acid, but where limed the surface horizon is less acid. Fragments of shale range from 0 to 10 percent in the A horizon and from 5 to 25 percent in the B and C horizons.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. It is silt loam or silty clay loam.

In the upper part the Bt horizon has hue of 10YR to 5YR, value of 4 or 5, and chroma of 4 to 6. In the lower part it has hue of 7.5YR to 2.5YR, value of 4 or 5, and chroma of 6 to 8. It has mottles in shades of brown, yellow, or red. In the fine earth fraction it is silty clay loam, silty clay, or clay.

The BC or C horizon has hue of 10YR to 5YR, value of 5, and chroma of 6 to 8. It has mottles in shades of brown, yellow, or red. In the fine earth fraction the BC or C horizon is silty clay loam or silty clay.

Staser Series

The Staser series consists of very deep, well drained soils. These soils formed in loamy alluvium on flood plains. Slopes range from 0 to 2 percent.

Staser soils are near Lindside, Newark, Swafford, and Sequatchie soils. Lindside and Newark soils are on adjacent flood plains. Lindside soils are moderately well drained. Newark soils are somewhat poorly drained. Swafford and Sequatchie soils are on low terraces adjacent to Staser soils and have an argillic horizon.

Typical pedon of Staser fine sandy loam, overwash, rarely flooded, 1.1 mile north of Bluff Road on Beaver Creek Road, 0.4 mile northeast of road; in pasture:

Ap—0 to 10 inches; dark brown (10YR 4/3) fine sandy loam; weak medium granular structure; very friable; many fine and few medium roots; few fine pores; medium acid; abrupt smooth boundary.

A1—10 to 16 inches; dark brown (10YR 3/3) loam; weak medium granular structure; very friable; many very fine and fine roots; common fine pores; medium acid; abrupt wavy boundary.
A2—16 to 28 inches; very dark grayish brown (10YR 3/2) silt loam; weak medium granular and fine subangular blocky structure; friable; many very fine and common fine roots; common fine and few medium tubular pores; few pebbles and cobbles; neutral; clear wavy boundary.
Bw1—28 to 40 inches; dark brown (10YR 3/3) silt loam; weak medium subangular blocky structure; friable; common very fine and fine roots; common fine and few medium tubular pores; few pebbles and cobbles; neutral; clear wavy boundary.
Bw2—40 to 55 inches; brown (10YR 5/3) silt loam; common coarse distinct dark yellowish brown (10YR 4/4) and grayish brown (10YR 5/2) mottles; weak fine prismatic structure parting to weak medium subangular blocky; firm; few very fine and fine roots; common fine and few medium tubular pores; few pebbles and cobbles; slightly acid; clear smooth boundary.
Bw3—55 to 65 inches; brown (7.5YR 4/4) loam; common fine distinct brown (10YR 5/3) and grayish brown (10YR 5/2) mottles; weak fine prismatic structure parting to weak medium subangular blocky; firm; few very fine roots; few fine and medium tubular pores; few pebbles and cobbles; few black manganese concretions; medium acid.

The mollic epipedon ranges from 24 to 40 inches in thickness. Depth to bedrock is more than 60 inches. The soils range from medium acid to neutral. Gravel and cobbles range from 0 to 5 percent in each horizon. Recent overwash ranges from 8 to 15 inches in thickness.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 3 or 4. It consists of recent overwash. It is fine sandy loam or loam.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 2 or 3. It is silt loam or loam.

The Bw horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 3 or 4. It is silt loam or loam. It has mottles in shades of brown and gray. Depth to mottles with chroma of 2 or less is more than 36 inches.

Some pedons have a C horizon, which has colors like those of the Bw horizon and is fine sandy loam or loam.

Swafford Series

The Swafford series consists of very deep, moderately well drained soils. These soils have a fragic layer in the subsoil. They formed in old alluvium on low stream terraces. Slopes range from 1 to 4 percent.

Swafford soils are near Staser, Lindside, and Nolichucky soils. Staser soils are on adjacent bottom lands and are well drained. Lindside soils are on bottom lands and do not have an argillic horizon. Nolichucky soils are on higher terraces and are well drained.

Typical pedon of Swafford silt loam, 1 to 4 percent slopes, rarely flooded, 100 feet east of the intersection of Barker Drive and Christopher Drive; on cropland:

Ap—0 to 9 inches; brown (10YR 4/3) silt loam; moderate medium granular and weak fine subangular blocky structure; very friable; many fine and medium roots; common fine pores; medium acid; abrupt smooth boundary.
BA—9 to 14 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; very friable; many fine and medium roots; common fine and medium tubular pores; strongly acid; clear smooth boundary.
Bt1—14 to 21 inches; yellowish brown (10YR 5/6) silt loam; weak medium subangular blocky structure; very friable; common fine and few medium roots; common very fine and fine tubular pores; few distinct clay films on faces of peds; strongly acid; clear wavy boundary.
Bt2—21 to 28 inches; yellowish brown (10YR 5/6) silt loam; few fine distinct light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; friable; common fine roots; common fine and few medium pores; common distinct clay films on faces of peds; strongly acid; abrupt wavy boundary.
Btx1—28 to 40 inches; brownish yellow (10YR 6/6) clay loam; many fine prominent yellowish red (5YR 5/8) and many medium distinct light gray (10YR 7/2) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; very firm; few fine roots on faces of prisms; common very fine and few fine pores; common distinct clay films on faces of peds; 40 to 60 percent brittle, by volume; very strongly acid; clear wavy boundary.

Btx2—40 to 48 inches; brownish yellow (10YR 6/6) clay loam; many coarse prominent light gray (10YR 7/2) and many medium prominent yellowish red (5YR 5/8) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; very firm; common fine and few medium pores; few distinct clay films on faces of peds; 40 to 60 percent brittle, by volume; very strongly acid; clear wavy boundary.

B´t—48 to 65 inches; strong brown (7.5YR 5/8) clay loam; many medium prominent light gray (10YR 7/2) mottles; weak coarse angular blocky structure; very firm; few fine pores; common distinct clay films on faces of peds; few fine pebbles; very strongly acid.

Thickness of the solum and depth to bedrock are more than 60 inches. Depth to the fragic layer ranges from 18 to 36 inches. The soils are strongly acid or very strongly acid, but where limed the surface layer is less acid. Gravel ranges from 0 to 10 percent in each horizon. Depth to mottles with chroma of 2 or less ranges from 18 to 30 inches.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is silt loam or loam.

The BA horizon has hue of 10YR, value of 4 or 5, and chroma of 4 to 6. It is silt loam or loam.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. In the lower part it has mottles in shades of brown, yellow, and gray. It is silt loam, loam, or clay loam.

The Btx horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 to 8. It has few to many mottles in shades of gray, brown, yellow, or red. It is clay loam, loam, or silt loam.

The B´t horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 to 8. It has common or many mottles in shades of gray or brown. It is clay loam, loam, or silt loam.

Talbott Series

The Talbott series consists of moderately deep, well drained soils. These soils formed in clayey residuum derived from limestone on uplands. Slopes range from 5 to 35 percent.

Talbott soils are near Collegedale, Dewey, and Montevallo soils. Collegedale and Dewey soils are in positions similar to those of Talbott soils. They are deeper than 60 inches to limestone bedrock. Montevallo soils are less than 20 inches deep to shale bedrock.

Typical pedon of Talbott silt loam, in an area of Talbott-Rock outcrop complex, karst, 10 to 35 percent slopes, eroded, 1,750 feet south of exit for Deep Springs off I-40, about 300 feet southeast of the intersection of Scarlett Road and Deep Springs Road:

Oe—1 inch to 0; decomposed hardwood leaf litter.

Ap—0 to 4 inches; dark brown (7.5YR 4/4) silt loam; moderate medium granular structure; friable; many fine and medium roots; common very fine and fine pores; medium acid; abrupt wavy boundary.

Bt1—4 to 7 inches; yellowish red (5YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable; few distinct clay films on faces of peds; many fine and medium roots; common very fine and fine pores; medium acid; clear smooth boundary.

Bt2—7 to 21 inches; yellowish red (5YR 5/6) clay; moderate fine and medium angular blocky structure; firm; many distinct clay films on faces of peds; common fine and medium roots; common very fine and fine pores; medium acid; clear smooth boundary.

Bt3—21 to 29 inches; red (2.5YR 4/6) clay; moderate medium and fine angular blocky structure; very firm; many distinct clay films on faces of peds; few fine and medium roots; few very fine and fine pores; medium acid; clear wavy boundary.

BC—29 to 32 inches; yellowish red (5YR 4/6) clay; common medium distinct dark reddish brown (5YR 3/2) and fine prominent strong brown (7YR 5/8) mottles; weak coarse blocky structure; very firm; few fine roots; few faint clay films on faces of peds; slightly acid; abrupt wavy boundary.

R—32 inches; limestone.

Thickness of the solum and depth to bedrock range from 20 to 40 inches. The soils range from slightly acid to strongly acid. Rock fragments range from 0 to 10 percent in each horizon.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. It is silt loam.

The Bt horizon has hue of 7.5YR, 5YR, or 2.5YR, value of 4 or 5, and chroma of 4 to 8. It has mottles in shades of brown, yellow, or red. It is silty clay or clay, but in the upper few inches it is also silty clay loam.

The BC or C horizon has hue of 2.5Y to 5YR, value of 4 to 6, and chroma of 4 to 8. It has few to many mottles in shades of brown, yellow, red, and gray. It is silty clay or clay.

Tasso Series

The Tasso series consists of very deep, well drained soils that have a fragic layer in the subsoil. These soils formed in colluvium and in the underlying residuum derived from limestone or shale or in old

alluvium. They are on foot slopes and benches. Slopes range from 2 to 5 percent.

Tasso soils are near Dunmore, Fullerton, and Minvale soils. Dunmore and Fullerton soils are on adjacent hillsides and are clayey. Minvale soils are on foot slopes and do not have a fragic layer in the subsoil.

Typical pedon of Tasso silt loam, 2 to 5 percent slopes, 1.2 miles north of Highway 139 on Patterson Road, 200 feet east of road; in a pastured area:

Ap—0 to 7 inches; brown (10YR 5/3) silt loam; moderate medium granular structure; very friable; many fine, medium, and coarse roots; common fine and few medium tubular pores; 10 percent fragments of chert up to 2 inches in diameter; very strongly acid; clear smooth boundary.

BA—7 to 13 inches; yellowish brown (10YR 5/4) silt loam; weak fine subangular blocky structure; very friable; many fine and medium roots; common fine and medium tubular pores; 10 percent fragments of chert up to 2 inches in diameter; very strongly acid; clear smooth boundary.

Bt—13 to 19 inches; yellowish brown (10YR 5/6) silt loam; few fine prominent yellowish red (5YR 4/6) mottles; weak fine subangular blocky structure; very friable; many fine and common medium roots; common fine and medium tubular pores; few faint clay films on faces of peds and in pores; 15 percent fragments of chert up to 2 inches in diameter; very strongly acid; clear smooth boundary.

Btx1—19 to 24 inches; strong brown (7.5YR 4/6) silty clay loam; common fine distinct pale brown (10YR 6/3) and few fine distinct red (5YR 4/6) mottles; weak medium prismatic structure parting to weak medium subangular blocky; firm; fine roots between prisms; common fine and few medium tubular pores; common distinct clay films on faces of peds; 5 percent fragments of chert up to 2 inches in diameter; very strongly acid; clear wavy boundary.

Btx2—24 to 33 inches; yellowish brown (10YR 5/6) silty clay loam; common medium prominent red (2.5YR 4/6) and few fine distinct pale brown (10YR 6/3) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm; fine roots between prisms; few fine and medium tubular pores; common distinct clay films on faces of peds; 2 percent fragments of chert up to 1 inch in diameter; very strongly acid; clear wavy boundary.

2Bt1—33 to 48 inches; red (2.5YR 4/6) silty clay loam; common fine prominent strong brown (2.5YR 5/8) and few fine prominent light brownish gray (10YR 6/2) and pale brown (10YR 6/3) mottles; moderate fine and medium subangular blocky structure; firm; few fine roots; common fine and medium tubular pores; many distinct clay films on faces of peds; 2 percent fragments of chert up to 1 inch in diameter; strongly acid; gradual wavy boundary.

2Bt2—48 to 65 inches; red (2.5YR 4/6) silty clay loam; common fine prominent strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; firm; few fine and medium tubular pores; many distinct clay films on faces of peds; 2 percent fragments of chert up to 1 inch in diameter; strongly acid.

Thickness of the solum and depth to bedrock are more than 60 inches. Reaction is strongly acid or very strongly acid, but where limed the surface layer is less acid. Fragments of chert and gravel range from 0 to 15 percent in the A, BA, and Bt horizons and from 0 to 25 percent in the Btx and 2Bt horizons.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is silt loam.

The BA horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8. It is silt loam.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8. It has mottles in shades of brown, yellow, or red. It is silt loam or silty clay loam.

The Btx horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 to 8. It has mottles in shades of gray, brown, yellow, red, or gray. Below a depth of 30 inches it has mottles with chroma of 2 or less. It is silty clay loam. It is, by volume, 40 to 60 percent brittle.

The 2Bt horizon has hue of 7.5YR, 5YR, or 2.5YR, value of 4 or 5, and chroma of 6 to 8. It has mottles in shades of brown, red, yellow, or gray. It is silty clay loam or clay.

Waynesboro Series

The Waynesboro series consists of very deep, well drained soils. These soils formed in old alluvium on high terraces. Slopes range from 5 to 20 percent.

Waynesboro soils are near Nolichucky and Etowah soils. Nolichucky soils are in positions similar to those of Waynesboro soils but are fine-loamy. Etowah soils are normally below Waynesboro soils, have a surface layer darker than that of Waynesboro soils, and are fine-loamy.

Typical pedon of Waynesboro loam, 5 to 12 percent slopes, eroded, from the intersection of Dickey and Stiles Roads, 0.3 mile south on Stiles Road; in a roadbank:

Ap—0 to 6 inches; yellowish brown (10YR 5/4) loam;

moderate medium granular structure; very friable; many fine and common medium roots; common fine and medium tubular pores; 5 percent chert and quartzite gravel up to 2 inches in diameter; neutral; clear smooth boundary.

Bt1—6 to 10 inches; yellowish red (5YR 4/6) clay loam; weak fine and medium subangular blocky structure; friable; many fine and medium roots; common fine and medium tubular pores; few distinct clay films on faces of peds; 5 percent chert and quartzite gravel up to 2 inches in diameter; strongly acid; clear smooth boundary.

Bt2—10 to 20 inches; red (2.5YR 4/6) clay loam; moderate medium subangular blocky structure; friable; many fine and common medium roots; common fine and medium tubular pores; common distinct clay films on faces of peds; 10 percent chert and quartzite gravel up to 2 inches in diameter; strongly acid; clear smooth boundary.

Bt3—20 to 34 inches; red (2.5YR 4/6) clay loam; moderate medium subangular blocky structure; friable; common fine roots; common fine and few medium tubular pores; common distinct clay films on faces of peds; 10 percent chert and quartzite gravel up to 2 inches in diameter; strongly acid; clear smooth boundary.

Bt4—34 to 43 inches; dark red (2.5YR 3/6) clay; moderate medium subangular blocky structure; friable; common fine roots; common fine and few medium tubular pores; many distinct clay films on faces of peds; 10 percent fragments of chert and quartzite gravel up to 2 inches in diameter; very strongly acid; gradual smooth boundary.

Bt5—43 to 56 inches; dark red (2.5YR 3/6) clay; moderate medium subangular blocky structure; friable; few fine and medium tubular pores; common distinct clay films on faces of peds; 13 percent fragments of chert and quartzite gravel up to 3 inches in diameter; very strongly acid; clear smooth boundary.

Bt6—56 to 65 inches; dark red (2.5YR 3/6) clay; moderate fine and weak medium subangular blocky structure; friable; common very fine and few fine tubular pores; common distinct clay films on faces of peds; 13 percent fragments of chert and quartzite gravel up to 3 inches in diameter; very strongly acid.

Thickness of the solum and depth to bedrock are more than 60 inches. The soils are strongly acid or very strongly acid, but where limed the surface is less acid. Fragments of chert and quartzite gravel range from 0 to 15 percent in all horizons.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. It is loam or silt loam.

The Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma 6 to 8, or it has hue of 2.5YR, value of 3, and chroma of 6. In some pedons the lower part has mottles in shades of brown, yellow, or red. This horizon is clay loam or clay.

Whitesburg Series

The Whitesburg series consists of deep, moderately well drained soils. These soils formed in alluvium derived from calcareous shale. They are in drainageways and on narrow bottoms and toe slopes. Slopes range from 0 to 3 percent.

Whitesburg soils are near Dandridge, Muse, and Sequoia soils. Dandridge soils are on uplands, are clayey-skeletal, and are less than 20 inches deep to bedrock. Muse soils are on adjacent foot slopes. They are clayey and well drained. Sequoia soils are on uplands. They are clayey and less than 40 inches deep to bedrock.

Typical pedon of Whitesburg silt loam, occasionally flooded, 0.3 mile north of Muddy Creek Road on Highway 92, about 0.2 mile west of highway; in pasture:

Ap—0 to 7 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine and weak medium granular structure; very friable; many fine and common medium roots; few fine tubular pores; 2 percent small fragments of shale; mildly alkaline; abrupt smooth boundary.

Bw1—7 to 11 inches; yellowish brown (10YR 5/6) silty clay loam; few medium faint yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; friable; few fine and medium roots; common very fine and few fine tubular pores; 5 percent small fragments of shale; mildly alkaline; clear smooth boundary.

Bw2—11 to 21 inches; yellowish brown (10YR 5/4) silty clay loam; few fine prominent strong brown (7.5YR 5/8) and light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; friable; few fine roots; common very fine and fine tubular pores; 5 percent small fragments of shale; common fine concentrations of manganese; mildly alkaline; clear smooth boundary.

Bw3—21 to 31 inches; yellowish brown (10YR 5/6) silty clay loam; few fine distinct light brownish gray (10YR 6/2) and many medium distinct strong brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine and medium tubular pores; 5 percent small fragments of shale; common fine

concentrations of manganese; mildly alkaline; clear smooth boundary.

C-31 to 41 inches; brown (10YR 5/3) silty clay loam; common fine distinct light brownish gray (10YR 6/2) and strong brown (7.5YR 5/6) mottles; massive; firm; few fine tubular pores; 13 percent fragments of shale and sandstone cobbles up to 5 inches in diameter; many medium concentrations of manganese; mildly alkaline; abrupt wavy boundary.

Cr-41 to 50 inches; soft, rippable, calcareous shale.

The solum ranges from 25 to 40 inches in thickness. Depth to rippable shale ranges from 40 to 60 inches. The soils are neutral or mildly alkaline. Fragments of shale range from 0 to 10 percent in the solum and from 5 to 15 percent in the C horizon.

The Ap horizon has hue of 10YR, value of 4, and chroma of 3 or 4. It is silt loam.

The Bw horizon has hue of 10YR or, in some pedons, 7.5YR, value of 4 or 5, and chroma of 4 to 6. It has mottles in shades of gray, brown, or yellow. Depth to mottles with chroma of 2 or less ranges from 15 to 24 inches. This horizon is silt loam or silty clay loam.

The C horizon has hue of 7.5YR, value of 4 or 5, and chroma of 2 to 6. It is silty clay loam or clay loam. It has few to many mottles in shades of gray, brown, or yellow.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvial cone. The material washed down the sides of mountains and hills by ephemeral streams and deposited at the mouth of gorges in the form of a moderately steep, conical mass descending equally in all directions from the point of issue.

Alluvial fan. The fanlike deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Alpha,alpha-dipyridyl. A dye that when dissolved in 1N ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction indicates a type of redoximorphic feature.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Arroyo. The flat-floored channel of an ephemeral stream, commonly with very steep to vertical banks cut in alluvium.

Aspect. The direction in which a slope faces.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 40-inch profile or to a limiting layer is expressed as:

Very low	0 to 2
Low	2 to 4
Moderate	4 to 6
High	more than 6

Back slope. The geomorphic component that forms the steepest inclined surface and principal element of many hillsides. Back slopes in profile are commonly steep, are linear, and may or may not include cliff segments.

Badland. Steep or very steep, commonly nonstony, barren land dissected by many intermittent drainage channels. Badland is most common in semiarid and arid regions where streams are entrenched in soft geologic material. Local relief generally ranges from 25 to 500 feet. Runoff potential is very high, and geologic erosion is active.

Basal area. The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine strata, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

Bedding system. A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography. A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout. A shallow depression from which all or most of the soil material has been removed by the wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breaks. The steep and very steep broken land at the border of an upland summit that is dissected by ravines.

Breast height. An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management. Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Cable yarding. A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve use of a drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, felled trees generally are reeled in while one end is lifted or the entire log is suspended.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

California bearing ratio (CBR). The load-supporting capacity of a soil as compared to that of standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Catsteps. Very small, irregular terraces on steep hillsides, especially in pasture, formed by the trampling of cattle or the slippage of saturated soil.

Cement rock. Shaly limestone used in the manufacture of cement.

Channery soil material. Soil material that is, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chemical treatment. Control of unwanted vegetation through the use of chemicals.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural

class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions. Low-chroma zones having a low content of iron, manganese, and clay because of the chemical reduction of iron and manganese and the removal of iron, manganese, and clay. A type of redoximorphic depletion.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax plant community. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that is 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

Colluvium. Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

Congeliturbate. Soil material disturbed by frost action.

Conglomerate. A coarse grained, clastic rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the “Soil Survey Manual.”

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coppice dune. A small dune of fine grained soil material stabilized around shrubs or small trees.

Coprogenous earth (sedimentary peat). Fecal material deposited in water by aquatic organisms.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cross-slope farming. Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Cuesta. A hill or ridge that has a gentle slope on one side and a steep slope on the other; specifically, an asymmetric, homoclinal ridge capped by resistant rock layers of slight or moderate dip.

Culmination of the mean annual increment (CMAI). The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Delta. A body of alluvium having a surface that is nearly flat and fan shaped; deposited at or near the mouth of a river or stream where it enters a body of relatively quiet water, generally a sea or lake.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Desert pavement. On a desert surface, a layer of gravel or larger fragments that was emplaced by upward movement of the underlying sediments or that remains after finer particles have been removed by running water or the wind.

Dip slope. A slope of the land surface, roughly determined by and approximately conforming to the dip of the underlying bedrock.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divided-slope farming. A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce the hazard of water erosion. One strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit a full stripcropping pattern to be used.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained*. These classes are defined in the "Soil Survey Manual."

Drainage, surface. Runoff, or surface flow of water, from an area.

Draw. A small stream valley that generally is more open and has broader bottom land than a ravine or gulch.

Duff. A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Endosaturation. A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Eolian soil material. Earthy parent material

accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Episaturation. A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic).—Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated).—Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Excess lime (in tables). Excess carbonates in the soil that restrict the growth of some plants.

Excess salts (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Excess sodium (in tables). Excess exchangeable sodium in the soil. The resulting poor physical properties restrict the growth of plants.

Excess sulfur (in tables). Excessive amount of sulfur in the soil. The sulfur causes extreme acidity if the soil is drained, and the growth of most plants is restricted.

Extrusive rock. Igneous rock derived from deep-seated molten matter (magma) emplaced on the earth's surface.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fan terrace. A relict alluvial fan, no longer a site of active deposition, incised by younger and lower alluvial surfaces.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fill slope. A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine textured soil. Sandy clay, silty clay, or clay.

Firebreak. Area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flaggy soil material. Material that is, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Foothill. A steeply sloping upland that has relief of as much as 1,000 feet (300 meters) and fringes a mountain range or high-plateau escarpment.

Foot slope. The inclined surface at the base of a hill.
Forb. Any herbaceous plant not a grass or a sedge.
Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.
Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.
Fragile (in tables). A soil that is easily damaged by use or disturbance.
Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.
Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.
Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.
Gilgai. Commonly, a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of clayey soils that shrink and swell considerably with changes in moisture content.
Glacial drift. Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.
Glacial outwash. Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.
Glacial till. Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.
Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.
Graded stripcropping. Growing crops in strips that grade toward a protected waterway.
Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.
Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.
Gravelly soil material. Material that is 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.
Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.
Ground water. Water filling all the unblocked pores of the material below the water table.
Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.
Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.
Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.
Head out. To form a flower head.
Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.
High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.
Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.
Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:
O horizon.—An organic layer of fresh and decaying plant residue.
A horizon.—The mineral horizon at or near the

surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the plants that are shorter and less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

Iron depletions. Low-chroma zones having a low content of iron and manganese oxide because of chemical reduction and removal, but having a clay content similar to that of the adjacent matrix. A type of redoximorphic depletion.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a

strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Knoll. A small, low, rounded hill rising above adjacent landforms.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low-residue crops. Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Low strength. The soil is not strong enough to support loads.

Marl. An earthy, unconsolidated deposit consisting chiefly of calcium carbonate mixed with clay in approximately equal amounts.

Masses. Concentrations of substances in the soil matrix that do not have a clearly defined boundary with the surrounding soil material and cannot be removed as a discrete unit. Common compounds making up masses are calcium carbonate, gypsum or other soluble salts, iron oxide, and manganese oxide. Masses consisting of iron oxide or manganese oxide generally are considered a type of redoximorphic concentration.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Mountain. A natural elevation of the land surface, rising more than 1,000 feet above surrounding

lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides. A mountain can occur as a single, isolated mass or in a group forming a chain or range.

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Mudstone. Sedimentary rock formed by induration of silt and clay in approximately equal amounts.

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Natric horizon. A special kind of argillic horizon that contains enough exchangeable sodium to have an adverse effect on the physical condition of the subsoil.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules. Cemented bodies lacking visible internal structure. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up nodules. If formed in place, nodules of iron oxide or manganese oxide are considered types of redoximorphic concentrations.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Low	less than 2.0 percent
Moderate	2.0 to 4.0 percent
High	more than 4.0 percent

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedisediment. A thin layer of alluvial material that mantles an erosion surface and has been transported to its present position from higher lying areas of the erosion surface.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permafrost. Layers of soil, or even bedrock, occurring in arctic or subarctic regions, in which a temperature below freezing has existed continuously for a long time.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as "saturated hydraulic conductivity," which is defined in the "Soil Survey Manual." In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as "permeability." Terms describing permeability, measured in inches per hour, are as follows:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	more than 6.0 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Pitting (in tables). Pits caused by melting around ice. They form on the soil after plant cover is removed.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plateau. An extensive upland mass with relatively flat summit area that is considerably elevated (more than 100 meters) above adjacent lowlands and separated from them on one or more sides by escarpments.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid or very rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Potential native plant community. See Climax plant community.

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning. Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Range condition. The present composition of the plant community on a range site in relation to the potential natural plant community for that site. Range condition is expressed as excellent, good, fair, or poor on the basis of how much the present plant community has departed from the potential.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Range site. An area of rangeland where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. A range site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other range sites in kind or proportion of species or total production.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	less than 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	more than 9.0

Red beds. Sedimentary strata that are mainly red and are made up largely of sandstone and shale.

Redoximorphic concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redoximorphic depletions. Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

Redoximorphic features. Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

Reduced matrix. A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Salty water (in tables). Water that is too salty for consumption by livestock.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saprolite. Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Scarification. The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Second bottom. The first terrace above the normal flood plain (or first bottom) of a river.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil generally is silty or clayey, is slippery when wet, and is low in productivity.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Sloughed till. Water-saturated till that has flowed slowly downhill from its original place of deposit by glacial ice. It may rest on other till, on glacial outwash, or on a glaciolacustrine deposit.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Sodic (alkali) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^{+} to $Ca^{++} + Mg^{++}$. The degrees of sodicity and their respective ratios are:

Slight	less than 13:1
Moderate	13-30:1
Strong	more than 30:1

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Talus. Fragments of rock and other soil material accumulated by gravity at the foot of cliffs or steep slopes.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material that is too thin for the specified use.

Till plain. An extensive area of nearly level to undulating soils underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Too arid (in tables). The soil is dry most of the time, and vegetation is difficult to establish.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Toxicity (in tables). Excessive amount of toxic substances, such as sodium or sulfur, that severely hinder establishment of vegetation or severely restrict plant growth.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Tuff. A compacted deposit that is 50 percent or more volcanic ash and dust.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland. Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Water bars. Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow. The uprooting and tipping over of trees by the wind.

Tables

Table 1.--Temperature and Precipitation

(Recorded in the period 1951-84 at Jefferson City, Tennessee)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average daily	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January	45.8	26.3	36.1	71	-3	20	4.29	2.66	5.75	9	2.4
February	50.6	28.8	39.7	75	3	36	3.99	1.98	5.74	8	1.7
March	60.0	36.0	48.0	81	14	105	5.16	3.42	6.73	10	1.1
April	69.6	44.0	56.8	86	27	223	3.99	2.50	5.32	8	.0
May	77.1	53.0	65.1	89	34	468	3.83	2.47	5.05	8	.0
June	83.6	60.5	72.1	94	46	663	3.70	1.92	5.26	7	.0
July	86.9	64.6	75.8	96	53	800	4.13	2.47	5.61	8	.0
August	86.8	63.4	75.1	95	52	778	3.03	1.64	4.24	7	.0
September	81.8	57.4	69.6	95	41	588	2.97	1.70	4.09	6	.0
October	70.5	44.3	57.4	86	26	246	2.81	1.33	4.12	5	.0
November	59.3	36.1	47.7	78	15	53	3.87	2.41	5.19	7	.9
December	49.4	29.5	39.5	72	5	34	4.30	2.35	6.02	8	.8
Yearly:											
Average	68.5	45.3	56.9	---	---	---	---	---	---	---	---
Extreme	---	---	---	98	-5	---	---	---	---	---	---
Total	---	---	---	---	---	4,014	46.07	40.68	51.40	91	6.9

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

Table 2.--Freeze Dates in Spring and Fall

(Recorded in the period 1951-84 at Jefferson City, Tennessee)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring			
1 year in 10 later than--	Apr. 5	Apr. 17	Apr. 30
2 years in 10 later than--	Mar. 30	Apr. 12	Apr. 24
5 years in 10 later than--	Mar. 17	Apr. 2	Apr. 15
First freezing temperature in fall			
1 year in 10 earlier than--	Oct. 29	Oct. 23	Oct. 10
2 years in 10 earlier than--	Nov. 4	Oct. 28	Oct. 15
5 years in 10 earlier than--	Nov. 15	Nov. 6	Oct. 24

Table 3.--Growing Season

(Recorded in the period 1951-84 at Jefferson City, Tennessee)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	215	197	172
8 years in 10	224	204	178
5 years in 10	242	218	191
2 years in 10	259	232	204
1 year in 10	268	239	211

Table 4.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
AeC	Arents, clayey, 2 to 12 percent slopes	659	0.3
AnC2	Allen sandy loam, 5 to 12 percent slopes, eroded	905	0.5
AnD2	Allen sandy loam, 12 to 20 percent slopes, eroded	1,218	0.6
AnE	Allen sandy loam, 20 to 40 percent slopes	1,169	0.6
ArD2	Armuchee channery silt loam, 10 to 25 percent slopes, eroded	1,084	0.5
ArE3	Armuchee channery silty clay loam, 15 to 45 percent slopes, severely eroded	2,313	1.2
ArF2	Armuchee channery silt loam, 25 to 60 percent slopes, eroded	2,820	1.4
Be	Beason silt loam, occasionally flooded	803	0.4
BoD	Bouldin cobbly sandy loam, 12 to 25 percent slopes, very stony	559	0.3
BoF	Bouldin cobbly sandy loam, 25 to 70 percent slopes, very stony	519	0.3
CoB2	Collegedale silt loam, 2 to 5 percent slopes, eroded	501	0.2
CoC2	Collegedale silt loam, 5 to 12 percent slopes, eroded	2,217	1.1
CoC3	Collegedale silty clay loam, 5 to 15 percent slopes, severely eroded	704	0.4
CoD2	Collegedale silt loam, 12 to 20 percent slopes, eroded	524	0.3
CtD2	Collegedale-Talbott-Rock outcrop complex, 5 to 20 percent slopes, eroded	7,649	3.8
CtE2	Collegedale-Talbott-Rock outcrop complex, 20 to 35 percent slopes, eroded	5,084	2.5
DaC2	Dandridge channery silt loam, 5 to 12 percent slopes, eroded	1,787	0.9
DaD2	Dandridge channery silt loam, 12 to 25 percent slopes, eroded	2,376	1.2
DaD3	Dandridge channery silty clay loam, 10 to 25 percent slopes, severely eroded	3,296	1.6
DaE3	Dandridge channery silty clay loam, 25 to 50 percent slopes, severely eroded	3,941	2.0
DaF2	Dandridge channery silt loam, 25 to 70 percent slopes, eroded	10,829	5.4
DcB2	Decatur silt loam, 2 to 5 percent slopes, eroded	1,668	0.8
DeC2	Dewey silt loam, 5 to 12 percent slopes, eroded	6,211	3.1
DeC3	Dewey silty clay loam, 5 to 12 percent slopes, severely eroded	3,301	1.6
DeD2	Dewey silt loam, 12 to 20 percent slopes, eroded	1,572	0.8
DeD3	Dewey silty clay loam, 12 to 20 percent slopes, severely eroded	2,931	1.5
DfD2	Dewey-Rock outcrop complex, 5 to 20 percent slopes, eroded	1,247	0.6
Dm	Dumps, mine	676	0.3
DuB2	Dunmore silt loam, 2 to 5 percent slopes, eroded	913	0.5
DuC2	Dunmore silt loam, 5 to 12 percent slopes, eroded	12,121	6.0
DuC3	Dunmore silty clay loam, 5 to 12 percent slopes, severely eroded	3,813	1.9
DuD2	Dunmore silt loam, 12 to 20 percent slopes, eroded	5,578	2.8
DuD3	Dunmore silty clay loam, 12 to 20 percent slopes, severely eroded	8,145	4.1
DuE2	Dunmore silt loam, 20 to 40 percent slopes, eroded	1,863	0.9
DuE3	Dunmore silty clay loam, 20 to 40 percent slopes, severely eroded	2,281	1.1
DwE3	Dunmore and Fullerton soils, 10 to 30 percent slopes, gullied	1,736	0.9
DxE2	Dunmore and Fullerton soils, karst, 10 to 30 percent slopes, eroded	7,523	3.7
Em	Emory silt loam, rarely flooded	1,295	0.6
En	Ennis cobbly loam, occasionally flooded	171	0.1
EtB	Etowah silt loam, 2 to 5 percent slopes	2,586	1.3
EtC	Etowah silt loam, 5 to 12 percent slopes	1,846	0.9
EtD	Etowah silt loam, 12 to 25 percent slopes	257	0.1
FaE2	Farragut silt loam, 20 to 40 percent slopes, eroded	234	0.1
FuC2	Fullerton gravelly silt loam, 5 to 12 percent slopes, eroded	3,912	1.9
FuD2	Fullerton gravelly silt loam, 12 to 25 percent slopes, eroded	6,822	3.4
FuE2	Fullerton gravelly silt loam, 25 to 45 percent slopes, eroded	3,346	1.7
GpD2	Gilpin channery silt loam, 12 to 25 percent slopes, eroded	209	0.1
GpF	Gilpin channery silt loam, 25 to 70 percent slopes	1,382	0.7
GuE3	Gullied land-Dandridge complex, 15 to 50 percent slopes, severely eroded	528	0.3
Ln	Lindside silt loam, occasionally flooded	3,206	1.6
MnC	Minvale gravelly silt loam, 5 to 15 percent slopes	1,116	0.6
MoC	Montevallo channery silt loam, 2 to 10 percent slopes	954	0.5
MoD	Montevallo channery silt loam, 10 to 20 percent slopes	409	0.2
MpE	Montevallo-Armuchee complex, 15 to 50 percent slopes, gullied	939	0.5
MuB	Muse silt loam, 2 to 5 percent slopes	894	0.4
MuC	Muse silt loam, 5 to 12 percent slopes	911	0.5
MwE	Muskingum silt loam, 25 to 50 percent slopes	1,032	0.5
Ne	Newark silt loam, frequently flooded	489	0.2
NkB2	Nolichucky loam, 2 to 5 percent slopes, eroded	2,884	1.4
NkC2	Nolichucky loam, 5 to 12 percent slopes, eroded	1,619	0.8
NkD2	Nolichucky loam, 12 to 20 percent slopes, eroded	385	0.2

Table 4.--Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Acres	Percent
NmD2	Nolichucky gravelly loam, 10 to 20 percent slopes, eroded	299	0.1
No	Nolin silt loam, occasionally flooded	1,437	0.7
Pu	Purdy silt loam	1,247	0.6
RaD	Ramsey-Rock outcrop complex, 12 to 25 percent slopes	348	0.2
RaF	Ramsey-Rock outcrop complex, 25 to 70 percent slopes	509	0.3
SeB2	Sequoia silt loam, 2 to 5 percent slopes, eroded	334	0.2
SeC2	Sequoia silt loam, 5 to 12 percent slopes, eroded	2,911	1.4
SeC3	Sequoia silty clay loam, 5 to 12 percent slopes, severely eroded	661	0.3
SeD2	Sequoia silt loam, 12 to 20 percent slopes, eroded	2,009	1.0
St	Staser fine sandy loam, overwash, rarely flooded	973	0.5
SwB	Swafford silt loam, 1 to 4 percent slopes, rarely flooded	2,048	1.0
TaE2	Talbott-Rock outcrop complex, karst, 10 to 35 percent slopes, eroded	4,195	2.1
TsB	Tasso silt loam, 2 to 5 percent slopes	1,276	0.6
WaC2	Waynesboro loam, 5 to 12 percent slopes, eroded	856	0.4
WaD2	Waynesboro loam, 12 to 20 percent slopes, eroded	284	0.1
Wb	Whitesburg silt loam, occasionally flooded	551	0.3
	Water	31,000	15.5
	Total	200,900	100.0

Table 5.--Prime Farmland

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland)

Map symbol	Soil name
Be	Beason silt loam, occasionally flooded
CoB2	Collegedale silt loam, 2 to 5 percent slopes, eroded
DcB2	Decatur silt loam, 2 to 5 percent slopes, eroded
DuB2	Dunmore silt loam, 2 to 5 percent slopes, eroded
Em	Emory silt loam, rarely flooded
EtB	Etowah silt loam, 2 to 5 percent slopes
Ln	Lindside silt loam, occasionally flooded
MuB	Muse silt loam, 2 to 5 percent slopes
NkB2	Nolichucky loam, 2 to 5 percent slopes, eroded
No	Nolin silt loam, occasionally flooded
St	Staser fine sandy loam, overwash, rarely flooded
SwB	Swafford silt loam, 1 to 4 percent slopes, rarely flooded
TsB	Tasso silt loam, 2 to 5 percent slopes
Wb	Whitesburg silt loam, occasionally flooded

Table 6.--Land Capability and Yields per Acre of Crops and Pasture

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Soybeans	Tobacco	Wheat	Alfalfa hay	Tall fescue-ladino
		Bu	Bu	Lbs	Bu	Tons	AUM*
AeC. Arents							
AnC2 Allen	IIIe	85	30	2,300	45	3.3	6.5
AnD2 Allen	IVe	75	26	2,050	42	3.0	6.0
AnE Allen	VIIe	---	---	---	---	---	5.0
ArD2 Armuchee	VIe	---	---	---	---	---	4.5
ArE3 Armuchee	VIIe	---	---	---	---	---	3.5
ArF2 Armuchee	VIIe	---	---	---	---	---	---
Be Beason	IIw	75	35	---	---	---	7.0
BoD, BoF Bouldin	VIIs	---	---	---	---	---	---
CoB2 Collegedale	IIIe	80	28	2,150	45	3.0	6.0
CoC2 Collegedale	IVe	70	---	1,950	42	2.8	5.5
CoC3 Collegedale	VIe	---	---	---	---	---	4.5
CoD2 Collegedale	VIe	---	---	---	---	---	5.0
CtD2** Collegedale-Talbott-Rock outcrop	VIs	---	---	---	---	---	4.5
CtE2** Collegedale-Talbott-Rock outcrop	VIIs	---	---	---	---	---	3.5
DaC2 Dandridge	VIe	---	---	---	---	---	3.5
DaD2 Dandridge	VIe	---	---	---	---	---	3.5
DaD3 Dandridge	VIIe	---	---	---	---	---	3.0

See footnotes at end of table.

Table 6.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Tobacco	Wheat	Alfalfa hay	Tall fescue-ladino
		Bu	Bu	Lbs	Bu	Tons	AUM*
DaE3---- Dandridge	VIIe	---	---	---	---	---	---
DaF2---- Dandridge	VIIe	---	---	---	---	---	---
DcB2---- Decatur	IIe	95	38	2,600	48	4.2	7.5
DeC2---- Dewey	IIIe	85	32	2,400	45	3.8	7.0
DeC3---- Dewey	IVe	70	---	---	38	3.0	6.0
DeD2---- Dewey	IVe	75	---	---	40	3.4	6.0
DeD3---- Dewey	VIe	---	---	---	---	---	5.0
DfD2**---- Dewey-Rock outcrop	VIs	---	---	---	---	---	5.0
Dm**. Dumps							
DuB2---- Dunmore	IIe	85	32	2,400	46	3.8	7.0
DuC2---- Dunmore	IIIe	75	28	2,200	44	3.6	6.5
DuC3---- Dunmore	IVe	60	---	---	38	2.8	5.5
DuD2---- Dunmore	IVe	65	---	---	40	3.2	6.0
DuD3---- Dunmore	VIe	---	---	---	---	---	5.0
DuE2---- Dunmore	VIIe	---	---	---	---	---	4.5
DuE3---- Dunmore	VIIe	---	---	---	---	---	4.0
DwE3---- Dunmore and Fullerton	VIIe	---	---	---	---	---	3.5
DxE2---- Dunmore and Fullerton	VIe	---	---	---	---	---	5.0
Em---- Emory	I	125	42	2,500	50	4.0	8.5

See footnotes at end of table.

Table 6.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Tobacco	Wheat	Alfalfa hay	Tall fescue-ladino
		Bu	Bu	Lbs	Bu	Tons	AUM*
En Ennis	IIIs	80	30	---	42	3.0	7.0
EtB Etowah	IIe	115	43	2,900	55	4.5	8.0
EtC Etowah	IIIe	105	39	2,700	52	4.2	7.5
EtD Etowah	IVe	85	32	2,400	46	3.7	6.5
FaE2 Farragut	VIIe	---	---	---	---	---	5.5
FuC2 Fullerton	IIIe	75	28	2,000	38	2.8	6.0
FuD2 Fullerton	IVe	---	---	---	32	2.5	5.5
FuE2 Fullerton	VIIe	---	---	---	---	---	4.5
GpD2 Gilpin	VIe	---	---	---	---	---	5.5
GpF Gilpin	VIIe	---	---	---	---	---	---
GuE3 Gullied land-Dandridge	VIIe	---	---	---	---	---	---
Ln Lindside	IIw	120	42	2,500	48	4.0	8.5
MnC Minvale	IIIe	85	30	2,250	40	3.6	7.0
MoC Montevallo	IVe	---	---	---	---	---	3.5
MoD Montevallo	VIe	---	---	---	---	---	3.0
MpE Montevallo-Armuchee	VIIe	---	---	---	---	---	---
MuB Muse	IIe	100	36	2,600	48	4.0	7.5
MuC Muse	IIIe	90	32	2,400	45	3.8	7.0
MwE Muskingum	VIIe	---	---	---	---	---	---

See footnotes at end of table.

Table 6.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Tobacco	Wheat	Alfalfa hay	Tall fescue-ladino
		Bu	Bu	Lbs	Bu	Tons	AUM*
Ne Newark	IIIw	80	30	---	---	---	7.0
NkB2 Nolichucky	IIe	90	32	2,450	48	3.8	7.0
NkC2 Nolichucky	IIIe	80	28	2,250	45	3.6	6.5
NkD2 Nolichucky	IVe	65	---	2,000	42	3.2	6.0
NmD2 Nolichucky	IVe	---	---	---	40	3.0	5.5
No Nolin	IIw	135	45	2,800	55	4.3	9.0
Pu Purdy	IVw	---	---	---	---	---	5.5
RaD** Ramsey-Rock outcrop	VIs	---	---	---	---	---	3.5
RaF** Ramsey-Rock outcrop	VIIs	---	---	---	---	---	---
SeB2 Sequoia	IIIe	70	---	2,000	42	2.7	6.0
SeC2 Sequoia	IVe	60	---	1,800	38	2.5	5.5
SeC3 Sequoia	VIe	---	---	---	---	---	4.5
SeD2 Sequoia	VIe	---	---	---	---	---	4.5
St Staser	I	130	45	2,800	55	4.5	9.0
SwB Swafford	IIe	100	38	2,200	48	3.5	8.0
TaE2** Talbott-Rock outcrop	VIIs	---	---	---	---	---	3.5
TsB Tasso	IIe	95	35	2,100	46	3.2	7.5
WaC2 Waynesboro	IIIe	90	32	2,400	46	3.8	7.0

See footnotes at end of table.

Table 6.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Tobacco	Wheat	Alfalfa hay	Tall fescue-ladino
		Bu	Bu	Lbs	Bu	Tons	AUM*
WaD2---------- Waynesboro	IVe	80	---	---	42	3.4	6.5
Wb---------- Whitesburg	IIw	90	34	2,200	45	3.2	7.5

* Animal unit month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

Table 7.--Woodland Management and Productivity

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Management concerns					Potential productivity			
	Erosion hazard	Equipment limitation	Seedling mortality	Wind-throw hazard	Plant competition	Common trees	Site index	Volume*	Trees to plant
AeC.									
Arents									
AnC2	Slight	Slight	Slight	Slight	Moderate	Yellow poplar	87	86	Yellow poplar,
Allen						Shortleaf pine	72	114	loblolly pine. shortleaf pine.
AnD2, AnE	Moderate	Moderate	Slight	Slight	Moderate	Yellow poplar	87	86	Yellow poplar,
Allen						Shortleaf pine	72	114	loblolly pine. shortleaf pine.
ArD2	Moderate	Moderate	Slight	Slight	Moderate	Shortleaf pine	60	86	Loblolly pine,
Armuchee						Virginia pine	60	86	Virginia pine.
						Southern red oak	60	43	
ArE3	Moderate	Moderate	Moderate	Slight	Moderate	Shortleaf pine	60	86	Loblolly pine,
Armuchee						Virginia pine	60	86	Virginia pine,
						Southern red oak	60	43	
ArF2	Severe	Severe	Slight	Slight	Moderate	Shortleaf pine	60	86	Loblolly pine,
Armuchee						Virginia pine	60	86	Virginia pine,
						Southern red oak	60	43	
Be	Slight	Moderate	Moderate	Slight	Moderate	Yellow poplar	90	86	Loblolly pine,
Beason						Sweetgum	80	86	sweetgum,
						White oak	70	57	yellow poplar.
						Southern red oak	70	57	
						Loblolly pine	80	114	
BoD	Slight	Moderate	Slight	Slight	Moderate	Yellow poplar	90	86	Yellow poplar,
Bouldin						Northern red oak	75	57	shortleaf
						Shortleaf pine	70	114	pine.
BoF	Moderate	Severe	Slight	Slight	Moderate	Yellow poplar	90	86	Yellow poplar,
Bouldin						Northern red oak	75	57	shortleaf
						Shortleaf pine	70	114	pine.
CoB2, CoC2	Slight	Moderate	Slight	Slight	Moderate	Southern red oak	70	57	Yellow poplar,
Collegedale						Yellow poplar	90	86	loblolly pine,
						White oak	70	57	shortleaf
						Shortleaf pine	70	114	pine, Virginia
						Virginia pine	70	114	pine.
						Loblolly pine	80	114	
CoC3	Slight	Moderate	Moderate	Slight	Moderate	Loblolly pine	70	86	Loblolly pine,
Collegedale						Virginia pine	60	86	Virginia pine,
						Eastern redcedar	40	43	shortleaf pine.

See footnotes at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Management concerns					Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
CoD2---------- Collegedale	Moderate	Moderate	Slight	Slight	Moderate	Southern red oak----	70	57	Yellow poplar, loblolly pine, shortleaf pine, Virginia pine.
						Yellow poplar-------	90	86	
						White oak-----------	70	57	
						Shortleaf pine------	70	114	
						Virginia pine-------	70	114	
						Loblolly pine-------	80	114	
CtD2**:									
Collegedale----	Slight	Moderate	Slight	Slight	Moderate	Southern red oak----	70	57	Yellow poplar, loblolly pine, shortleaf pine, Virginia pine.
						Yellow poplar-------	90	86	
						White oak-----------	70	57	
						Shortleaf pine------	70	114	
						Virginia pine-------	70	114	
						Loblolly pine-------	80	114	
Talbott--------	Slight	Slight	Slight	Slight	Moderate	Southern red oak----	65	43	Loblolly pine, shortleaf pine, Virginia pine, eastern redcedar.
						Loblolly pine-------	80	114	
						Shortleaf pine------	64	100	
						Eastern redcedar----	46	57	
Rock outcrop.									
CtE2**:									
Collegedale----	Moderate	Moderate	Slight	Slight	Moderate	Southern red oak----	70	57	Yellow poplar, loblolly pine, shortleaf pine, Virginia pine.
						Yellow poplar-------	90	86	
						White oak-----------	70	57	
						Shortleaf pine------	70	114	
						Virginia pine-------	70	114	
						Loblolly pine-------	80	114	
Talbott--------	Moderate	Moderate	Slight	Slight	Moderate	Southern red oak----	65	43	Loblolly pine, shortleaf pine, Virginia pine, eastern redcedar.
						Loblolly pine-------	80	114	
						Shortleaf pine------	64	100	
						Eastern redcedar----	46	57	
Rock outcrop.									
DaC2---------- Dandridge	Slight	Slight	Moderate	Severe	Slight	Southern red oak----	60	43	Virginia pine, eastern redcedar.
						Virginia pine-------	55	86	
						Eastern redcedar----	40	43	
DaD2, DaD3------ Dandridge	Slight	Moderate	Moderate	Severe	Slight	Southern red oak----	60	43	Virginia pine, eastern redcedar.
						Virginia pine-------	55	86	
						Eastern redcedar----	40	43	
DaE3, DaF2------ Dandridge	Moderate	Severe	Moderate	Severe	Slight	Southern red oak----	60	43	Virginia pine, eastern redcedar.
						Virginia pine-------	55	86	
						Eastern redcedar----	40	43	
DcB2---------- Decatur	Slight	Slight	Slight	Slight	Moderate	Shortleaf pine------	66	114	Yellow poplar, black walnut, loblolly pine, shortleaf, pine, eastern white pine.
						Yellow poplar-------	90	86	
						Loblolly pine-------	80	114	
						Virginia pine-------	70	114	
						Eastern white pine--	80	143	
						White oak-----------	75	57	
						Southern red oak----	75	57	

See footnotes at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Management concerns					Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Wind-throw hazard	Plant competition	Common trees	Site index	Volume*	
DeC2---------- Dewey	Slight	Slight	Slight	Slight	Moderate	Yellow poplar-------	90	86	Yellow poplar,
						White oak----------	70	57	black walnut,
						Southern red oak----	70	57	loblolly pine,
						Shortleaf pine------	73	114	eastern white
						Virginia pine-------	70	114	pine.
						Loblolly pine-------	78	114	
DeC3---------- Dewey	Slight	Moderate	Moderate	Slight	Moderate	Loblolly pine-------	70	86	Loblolly pine,
						Virginia pine-------	60	86	eastern
						Eastern redcedar----	40	43	redcedar,
						Eastern white pine--	70	114	eastern white
									pine.
DeD2---------- Dewey	Moderate	Moderate	Slight	Slight	Moderate	Yellow poplar-------	90	86	Yellow poplar,
						White oak----------	70	57	black walnut,
						Southern red oak----	70	57	loblolly pine,
						Shortleaf pine------	73	114	eastern white
						Virginia pine-------	70	114	pine.
						Loblolly pine-------	78	114	
DeD3---------- Dewey	Moderate	Moderate	Moderate	Slight	Moderate	Loblolly pine-------	70	86	Loblolly pine,
						Virginia pine-------	60	86	eastern
						Eastern redcedar----	40	43	redcedar,
						Eastern white pine--	70	114	eastern white
									pine.
DfD2**:									
Dewey----------	Moderate	Moderate	Moderate	Slight	Moderate	Loblolly pine-------	70	86	Loblolly pine,
						Virginia pine-------	60	86	eastern
						Eastern redcedar----	40	43	redcedar,
						Eastern white pine--	70	114	eastern white
									pine.
Rock outcrop.									
Dm*.									
Dumps									
DuB2, DuC2------ Dunmore	Slight	Slight	Slight	Slight	Moderate	Yellow poplar-------	90	86	Yellow poplar,
						White oak----------	70	57	black walnut,
						Southern red oak----	70	57	shortleaf
						Shortleaf pine------	70	114	pine, eastern
						Eastern white pine--	80	143	white pine,
						Virginia pine-------	70	141	loblolly pine.
DuC3---------- Dunmore	Slight	Moderate	Moderate	Slight	Moderate	Loblolly pine-------	70	86	Loblolly pine,
						Virginia pine-------	60	86	eastern white
						Eastern white pine--	70	114	pine, eastern
						Eastern redcedar----	40	43	redcedar.
DuD2---------- Dunmore	Moderate	Moderate	Slight	Slight	Moderate	Yellow poplar-------	90	86	Yellow poplar,
						White oak----------	70	57	black walnut,
						Southern red oak----	70	57	shortleaf
						Shortleaf pine------	70	114	pine, eastern
						Eastern white pine--	80	143	white pine,
						Virginia pine-------	70	114	loblolly pine.

See footnotes at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Management concerns					Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
DuD3--Dunmore	Moderate	Moderate	Moderate	Slight	Moderate	Loblolly pine	70	86	Loblolly pine, eastern white pine, eastern redcedar.
						Virginia pine	60	86	
						Eastern white pine	70	114	
						Eastern redcedar	40	43	
DuE2--Dunmore	Moderate	Moderate	Slight	Slight	Moderate	Yellow poplar	90	86	Yellow poplar, black walnut, shortleaf pine, eastern white pine, loblolly pine.
						White oak	70	57	
						Southern red oak	70	57	
						Shortleaf pine	70	114	
						Eastern white pine	80	143	
						Virginia pine	70	114	
DuE3--Dunmore	Moderate	Moderate	Moderate	Slight	Moderate	Loblolly pine	70	86	Loblolly pine, eastern white pine, eastern redcedar.
						Virginia pine	60	86	
						Eastern white pine	70	114	
						Eastern redcedar	40	43	
DwE3**:									
Dunmore	Moderate	Moderate	Moderate	Slight	Moderate	Loblolly pine	70	86	Loblolly pine, eastern white pine, eastern redcedar.
						Virginia pine	60	86	
						Eastern white pine	70	114	
						Eastern redcedar	40	43	
Fullerton	Slight	Moderate	Moderate	Slight	Moderate	Southern red oak	60	43	Loblolly pine, shortleaf pine.
						Shortleaf pine	60	86	
DxE2**:									
Dunmore	Moderate	Moderate	Slight	Slight	Moderate	Yellow poplar	90	86	Yellow poplar, black walnut, shortleaf pine, eastern white pine, loblolly pine.
						White oak	70	57	
						Southern red oak	70	57	
						Shortleaf pine	70	114	
						Eastern white pine	80	143	
						Virginia pine	70	114	
Fullerton	Moderate	Moderate	Slight	Slight	Moderate	Yellow poplar	90	86	Yellow poplar, loblolly pine.
						Southern red oak	70	57	
						Shortleaf pine	67	100	
Em--Emory	Slight	Slight	Slight	Slight	Severe	Yellow poplar	104	114	Yellow poplar, black walnut, loblolly pine.
						Northern red oak	80	57	
						Loblolly pine	90	129	
						Black walnut	---	---	
						White ash	---	---	
						Black cherry	---	---	
En--Ennis	Slight	Slight	Slight	Slight	Moderate	Yellow poplar	100	114	Yellow poplar, black walnut, loblolly pine.
						White oak	80	57	
						Loblolly pine	90	129	
EtB, EtC--Etowah	Slight	Slight	Slight	Slight	Moderate	Yellow poplar	90	86	Yellow poplar, black walnut, loblolly pine.
						Southern red oak	80	57	
						Loblolly pine	90	129	
						Shortleaf pine	80	129	
EtD--Etowah	Moderate	Moderate	Slight	Slight	Moderate	Yellow poplar	90	86	Yellow poplar, black walnut, loblolly pine.
						Southern red oak	80	57	
						Loblolly pine	90	129	
						Shortleaf pine	80	129	

See footnotes at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Management concerns					Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Wind-throw hazard	Plant competition	Common trees	Site index	Volume*	
FaE2---------- Farragut	Moderate	Moderate	Slight	Slight	Moderate	Yellow poplar-------	90	86	Yellow poplar,
						Southern red oak----	70	57	eastern white
						Loblolly pine-------	80	114	pine, black
						Shortleaf pine------	70	114	walnut,
									loblolly pine.
FuC2---------- Fullerton	Slight	Slight	Slight	Slight	Moderate	Yellow poplar-------	90	86	Yellow poplar,
						Southern red oak----	70	57	loblolly pine.
						Shortleaf pine------	67	100	
FuD2---------- Fullerton	Moderate	Moderate	Slight	Slight	Moderate	Yellow poplar-------	90	86	Yellow poplar,
						Southern red oak----	70	57	loblolly pine.
						Shortleaf pine------	67	100	
FuE2---------- Fullerton	Severe	Severe	Slight	Slight	Moderate	Yellow poplar-------	90	86	Yellow poplar,
						Southern red oak----	70	57	loblolly pine.
						Shortleaf pine------	67	100	
GpD2---------- Gilpin	Moderate	Moderate	Slight	Slight	Moderate	Southern red oak----	80	57	Virginia pine,
						Yellow poplar-------	95	100	eastern white
						Shortleaf pine------	70	114	pine, loblolly
						Virginia pine-------	65	100	pine.
GpF---------- Gilpin	Severe	Severe	Slight	Slight	Moderate	Southern red oak----	80	57	Virginia pine,
						Yellow poplar-------	95	100	eastern white
						Shortleaf pine------	70	114	pine, loblolly
						Virginia pine-------	65	100	pine.
GuE3**:									
Gullied land.									
Dandridge------	Slight	Moderate	Moderate	Severe	Slight	Southern red oak----	60	43	Virginia pine,
						Virginia pine-------	55	86	eastern
						Eastern redcedar----	40	43	redcedar.
Ln---------- Lindside	Slight	Slight	Slight	Slight	Severe	Southern red oak----	86	72	Eastern white
						Yellow poplar-------	95	100	pine, yellow
						Black walnut--------	---	---	poplar, black
						White ash-----------	85	57	walnut,
						White oak-----------	85	72	shortleaf
						Red maple-----------	---	---	pine, loblolly
									pine.
MnC---------- Minvale	Slight	Slight	Slight	Slight	Moderate	Yellow poplar-------	90	86	Yellow poplar,
						White oak-----------	70	57	black walnut,
						Shortleaf pine------	70	114	loblolly pine.
						Loblolly pine-------	80	114	
						Virginia pine-------	70	114	
MoC---------- Montevallo	Slight	Slight	Moderate	Moderate	Slight	Virginia pine-------	61	86	Virginia pine,
						Southern red oak----	55	43	eastern
									redcedar.
MoD---------- Montevallo	Moderate	Moderate	Moderate	Moderate	Slight	Virginia pine-------	61	86	Virginia pine,
						Southern red oak----	55	43	eastern
									redcedar.

See footnotes at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Management concerns					Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
MpE**:									
Montevallo	Moderate	Moderate	Moderate	Moderate	Slight	Virginia pine	61	86	Virginia pine, eastern redcedar.
						Southern red oak	55	43	
Armuchee	Moderate	Moderate	Slight	Slight	Moderate	Shortleaf pine	60	86	Loblolly pine, Virginia pine.
						Virginia pine	60	86	
						Southern red oak	60	43	
MuB, MuC Muse	Slight	Slight	Slight	Slight	Moderate	Shortleaf pine	79	129	Shortleaf pine, white oak, eastern white pine, yellow poplar, northern red oak.
						Virginia pine	67	100	
						White oak	59	43	
						Red maple	---	---	
						Yellow poplar	---	---	
						Black oak	56	43	
						Chestnut oak	62	43	
MwE Muskingum	Moderate	Severe	Slight	Slight	Moderate	Northern red oak	78	57	Eastern white pine, yellow poplar, Virginia pine, shortleaf pine, black walnut.
						Yellow poplar	95	100	
						Virginia pine	75	114	
						Eastern white pine	85	157	
						Shortleaf pine	80	129	
Ne Newark	Slight	Moderate	Slight	Moderate	Severe	Pin oak	96	72	Eastern cottonwood, sweetgum, American sycamore.
						Eastern cottonwood	89	100	
						Sweetgum	85	86	
						Green ash	---	--	
						Cherrybark oak	---	--	
						Shumard oak	---	--	
						Overcup oak	---	--	
NkB2, NkC2 Nolichucky	Slight	Slight	Slight	Slight	Moderate	Yellow poplar	100	114	Yellow poplar, eastern white pine, loblolly pine, shortleaf pine.
						Southern red oak	80	57	
						Eastern white pine	90	172	
						Shortleaf pine	80	129	
						Virginia pine	80	114	
NkD2, NmD2 Nolichucky	Moderate	Moderate	Slight	Slight	Moderate	Yellow poplar	100	114	Yellow poplar, eastern white pine, loblolly pine, shortleaf pine.
						Southern red oak	80	57	
						Eastern white pine	90	172	
						Shortleaf pine	80	129	
						Virginia pine	80	114	
No Nolin	Slight	Slight	Slight	Slight	Severe	Yellow poplar	107	114	Yellow poplar, eastern white pine, cottonwood, cherrybark oak, sweetgum, black walnut.
						Sweetgum	92	114	
						Cherrybark oak	97	143	
						Black walnut	---	---	
						American sycamore	---	---	

See footnotes at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Management concerns					Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
Pu--Purdy	Slight	Severe	Severe	Severe	Severe	Willow oak	85	86	Willow oak, sweetgum, American sycamore, eastern cottonwood.
						Sweetgum	85	86	
						American sycamore	---	---	
RaD**:									
Ramsey	Moderate	Moderate	Moderate	Severe	Slight	Northern red oak	60	43	Eastern white pine, shortleaf pine, Virginia pine.
						Shortleaf pine	59	86	
						Eastern white pine	70	114	
						Virginia pine	60	86	
Rock outcrop.									
RaF**:									
Ramsey	Moderate	Severe	Moderate	Severe	Slight	Northern red oak	60	43	Eastern white pine, shortleaf pine, Virginia pine.
						Shortleaf pine	59	86	
						Eastern white pine	70	114	
						Virginia pine	60	86	
Rock outcrop.									
SeB2, SeC2--Sequoia	Slight	Slight	Slight	Slight	Moderate	Northern red oak	70	57	Loblolly pine, shortleaf pine, Virginia pine.
						Loblolly pine	83	114	
						Shortleaf pine	63	100	
						Virginia pine	71	114	
SeC3--Sequoia	Slight	Moderate	Moderate	Slight	Moderate	Northern red oak	60	43	Loblolly pine, shortleaf pine, Virginia pine.
						Loblolly pine	70	86	
						Shortleaf pine	60	86	
						Virginia pine	60	86	
SeD2--Sequoia	Moderate	Moderate	Slight	Slight	Moderate	Northern red oak	70	57	Loblolly pine, shortleaf pine, Virginia pine.
						Loblolly pine	83	114	
						Shortleaf pine	63	100	
						Virginia pine	71	114	
St--Staser	Slight	Slight	Slight	Slight	Severe	Yellow poplar	100	114	Yellow poplar, black walnut, loblolly pine.
						White oak	80	57	
						Loblolly pine	90	129	
						Black walnut	---	---	
SwB--Swafford	Slight	Slight	Slight	Slight	Moderate	Yellow poplar	95	100	Yellow poplar, loblolly pine, sweetgum.
						Northern red oak	75	57	
						Sweetgum	90	100	
TaE2**:									
Talbott	Moderate	Moderate	Slight	Slight	Moderate	Southern red oak	65	43	Loblolly pine, shortleaf pine, Virginia pine, eastern redcedar.
						Shortleaf pine	64	100	
						Eastern redcedar	46	57	
						Virginia pine	60	86	
Rock outcrop.									

See footnotes at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Management concerns					Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
TsB--Tasso	Slight	Slight	Slight	Slight	Moderate	Southern red oak Yellow poplar White oak Shortleaf pine Virginia pine	70 90 70 70 70	57 86 57 114 114	Loblolly pine, shortleaf pine, Virginia pine.
WaC2--Waynesboro	Slight	Slight	Slight	Slight	Moderate	Yellow poplar Southern red oak White oak Loblolly pine	90 70 70 80	86 57 57 114	Yellow poplar, shortleaf pine, loblolly pine, black walnut.
WaD2--Waynesboro	Moderate	Moderate	Slight	Slight	Moderate	Yellow poplar Southern red oak White oak Loblolly pine	90 70 70 80	86 57 57 114	Yellow poplar, shortleaf pine, loblolly pine, black walnut.
Wb--Whitesburg	Slight	Slight	Slight	Slight	Severe	Yellow poplar Southern red oak Sweetgum Eastern white pine Black locust	95 75 90 90 ---	100 57 100 172 ---	Eastern white pine, loblolly pine, yellow poplar, black walnut, sweetgum.

* Volume is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** See description of the map unit for composition and behavior characteristics of the map unit.

Table 8.--Recreational Development

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AeC. Arents					
AnC2 Allen	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
AnD2 Allen	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
AnE Allen	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
ArD2 Armuchee	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate	Severe: slope.
ArE3, ArF2 Armuchee	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Be Beason	Severe: flooding, wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.
BoD Bouldin	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: large stones, slope.	Severe: slope.
BoF Bouldin	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
CoB2 Collegedale	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Slight	Slight.
CoC2 Collegedale	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
CoC3 Collegedale	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
CoD2 Collegedale	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
CtD2*: Collegedale	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
Talbott	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope, depth to rock.

See footnote at end of table.

Table 8.--Recreational Development--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
CtD2*:					
Rock outcrop.					
CtE2*:					
Collegedale	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Talbott	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
DaC2	Severe: small stones, depth to rock.	Severe: depth to rock.	Severe: slope, small stones, depth to rock.	Slight	Severe: small stones, depth to rock.
DaD2, DaD3	Severe: slope, small stones, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope.	Severe: small stones, slope, depth to rock.
DaE3, DaF2	Severe: slope, small stones, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.	Severe: small stones, slope, depth to rock.
DcB2	Slight	Slight	Moderate: slope.	Slight	Slight.
DeC2, DeC3	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
DeD2, DeD3	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
DfD2*:					
Dewey	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Rock outcrop.					
Dm*.					
Dumps					
DuB2	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
DuC2, DuC3	Moderate	Moderate	Severe: slope.	Slight	Moderate: slope.
DuD2, DuD3	Severe: slope.	Severe: slope.	Severe: slope.	Moderate	Severe: slope.
DuE2, DuE3	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

Table 8.--Recreational Development--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
DwE3*, DxE2*:					
Dunmore	Severe: slope.	Severe: slope.	Severe: slope.	Moderate	Severe: slope.
Fullerton	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.	Severe: small stones, slope.
Em Emory	Severe: flooding.	Slight	Slight	Slight	Slight.
En Ennis	Severe: flooding.	Moderate: large stones, small stones.	Severe: large stones, small stones.	Moderate: large stones.	Severe: large stones.
EtB Etowah	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
EtC Etowah	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
EtD Etowah	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
FaE2 Farragut	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
FuC2 Fullerton	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Slight	Severe: small stones.
FuD2 Fullerton	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.	Severe: small stones, slope.
FuE2 Fullerton	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.	Severe: small stones, slope.
GpD2 Gilpin	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Moderate: slope, large stones.	Severe: slope.
GpF Gilpin	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Severe: slope.	Severe: slope.
GuE3*:					
Gullied land.					
Dandridge	Severe: slope, small stones, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.	Severe: small stones, slope, depth to rock.
Ln Lindside	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Moderate: wetness.	Moderate: flooding.

See footnote at end of table.

Table 8.--Recreational Development--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
MnC Minvale	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, slope.
MoC Montevallo	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones, depth to rock.	Slight	Severe: droughty, depth to rock.
MoD Montevallo	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope.	Severe: droughty, slope, depth to rock.
MpE*: Montevallo	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.	Severe: droughty, slope, depth to rock.
Armuchee	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
MuB Muse	Moderate: small stones, percs slowly.	Moderate: small stones, percs slowly.	Severe: small stones.	Slight	Moderate: small stones.
MuC Muse	Moderate: slope, small stones, percs slowly.	Moderate: slope, small stones, percs slowly.	Severe: slope, small stones.	Slight	Moderate: small stones, slope.
MwE Muskingum	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Ne Newark	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
NkB2 Nolichucky	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
NkC2 Nolichucky	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
NkD2 Nolichucky	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
NmD2 Nolichucky	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
No Nolin	Severe: flooding.	Slight	Slight	Slight	Moderate: flooding.
Pu Purdy	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.

See footnote at end of table.

Table 8.--Recreational Development--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
RaD*:					
Ramsey	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Moderate: slope.	Severe: slope, depth to rock.
Rock outcrop.					
RaF*:					
Ramsey	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
Rock outcrop.					
SeB2	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, depth to rock.	Slight	Moderate: droughty.
SeC2, SeC3	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: droughty, slope.
SeD2	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
St	Severe: flooding.	Slight	Slight	Slight	Slight.
SwB	Severe: flooding.	Moderate: wetness, percs slowly.	Moderate: slope, small stones, wetness.	Slight	Slight.
TaE2*:					
Talbott	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Rock outcrop.					
TsB	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Slight	Slight.
WaC2	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
WaD2	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Wb	Severe: flooding.	Moderate: wetness.	Moderate: small stones, flooding.	Slight	Moderate: flooding.

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 9.--Wildlife Habitat

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AeC. Arents										
AnC2---------- Allen	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
AnD2---------- Allen	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
AnE---------- Allen	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
ArD2---------- Armuchee	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
ArE3, ArF2--------- Armuchee	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Be---------- Beason	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
BoD, BoF---------- Bouldin	Very poor.	Very poor.	Fair	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
CoB2---------- Collegedale	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CoC2---------- Collegedale	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CoC3---------- Collegedale	Fair	Fair	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
CoD2---------- Collegedale	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
CtD2*: Collegedale-------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Talbott----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Rock outcrop.										
CtE2*: Collegedale-------	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Talbott----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Rock outcrop.										

See footnote at end of table.

Table 9.--Wildlife Habitat--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba-ceous plants	Hardwood trees	Conif-erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
DaC2--- Dandridge	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.
DaD2, DaD3--- Dandridge	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.
DaE3, DaF2--- Dandridge	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.
DcB2--- Decatur	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
DeC2--- Dewey	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
DeC3--- Dewey	Very poor.	Very poor.	Fair	Good	Good	Very poor.	Very poor.	Poor	Poor	Very poor.
DeD2--- Dewey	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
DeD3--- Dewey	Very poor.	Very poor.	Fair	Good	Good	Very poor.	Very poor.	Poor	Poor	Very poor.
DfD2*: Dewey---	Very poor.	Very poor.	Fair	Good	Good	Very poor.	Very poor.	Poor	Poor	Very poor.
Rock outcrop.										
Dm*. Dumps										
DuB2--- Dunmore	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
DuC2--- Dunmore	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
DuC3--- Dunmore	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
DuD2--- Dunmore	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
DuD3--- Dunmore	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
DuE2--- Dunmore	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
DuE3--- Dunmore	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
DwE3*: Dunmore---	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Fullerton---	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

See footnote at end of table.

Table 9.--Wildlife Habitat--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba-ceous plants	Hardwood trees	Conif-erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
DxE2*:										
Dunmore	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Fullerton	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Em	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Emory										
En	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Poor.
Ennis										
EtB	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Etowah										
EtC	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Etowah										
EtD	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Etowah										
FaE2	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Farragut										
FuC2	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Fullerton										
FuD2	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Fullerton										
FuE2	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Fullerton										
GpD2	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Gilpin										
GpF	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Gilpin										
GuE3*:										
Gullied land.										
Dandridge	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.
Ln	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Lindside										
MnC	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Minvale										
MoC, MoD	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Montevallo										
MpE*:										
Montevallo	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.

See footnote at end of table.

Table 9.--Wildlife Habitat--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
MpE*:										
Armuchee	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
MuB---Muse	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MuC---Muse	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MwE---Muskingum	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Ne---Newark	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
NkB2---Nolichucky	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
NkC2---Nolichucky	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
NkD2, NmD2---Nolichucky	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
No---Nolin	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Pu---Purdy	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
RaD*, RaF*:										
Ramsey	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.
Rock outcrop.										
SeB2---Sequoia	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
SeC2, SeC3---Sequoia	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
SeD2---Sequoia	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
St---Staser	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
SwB---Swafford	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
TaE2*:										
Talbott	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Rock outcrop.										
TsB---Tasso	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

See footnote at end of table.

Table 9.--Wildlife Habitat--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
WaC2---------- Waynesboro	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WaD2---------- Waynesboro	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Wb---------- Whitesburg	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 10.--Building Site Development

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AeC. Arents						
AnC2---------- Allen	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
AnD2, AnE-------- Allen	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
ArD2, ArE3, ArF2- Armuchee	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Be---------- Beason	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding.	Moderate: wetness, flooding.
BoD, BoF--------- Bouldin	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope.
CoB2---------- Collegedale	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
CoC2, CoC3------- Collegedale	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
CoD2---------- Collegedale	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
CtD2*: Collegedale----- Talbott--------- Rock outcrop.	Moderate: too clayey, slope. Severe: depth to rock.	Moderate: shrink-swell, slope. Moderate: shrink-swell, slope, depth to rock.	Moderate: slope, shrink-swell. Severe: depth to rock.	Severe: slope. Severe: slope.	Severe: low strength. Severe: low strength.	Moderate: slope. Moderate: slope, depth to rock.
CtE2*: Collegedale----- Talbott--------- Rock outcrop.	Severe: slope. Severe: depth to rock.	Severe: slope. Moderate: shrink-swell, slope, depth to rock.	Severe: slope. Severe: depth to rock.	Severe: slope. Severe: slope.	Severe: low strength, slope. Severe: low strength.	Severe: slope. Moderate: slope, depth to rock.

See footnote at end of table.

Table 10.--Building Site Development--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
CtE2*:						
Talbott	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Rock outcrop.						
DaC2	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: small stones, depth to rock.
DaD2, DaD3, DaE3, DaF2	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope, depth to rock.
DcB2	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength.	Slight.
DeC2, DeC3	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
DeD2, DeD3	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
DfD2*:						
Dewey	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
Rock outcrop.						
Dm*.						
Dumps						
DuB2	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, low strength.	Slight.
DuC2, DuC3	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: shrink-swell, low strength, slope.	Moderate: slope.
DuD2, DuD3, DuE2, DuE3	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
DwE3*, DxE2*:						
Dunmore	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Fullerton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.

See footnote at end of table.

Table 10.--Building Site Development--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Em Emory	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength.	Slight.
En Ennis	Moderate: large stones, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: large stones.
EtB Etowah	Moderate: too clayey.	Slight	Slight	Slight	Moderate: low strength.	Slight.
EtC Etowah	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
EtD Etowah	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
FaE2 Farragut	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
FuC2 Fullerton	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: shrink-swell, low strength, slope.	Severe: small stones.
FuD2, FuE2 Fullerton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
GpD2, GpF Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
GuE3*: Gullied land.						
Dandridge	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope, depth to rock.
Ln Lindside	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
MnC Minvale	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: small stones, slope.
MoC Montevallo	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock.	Severe: droughty, depth to rock.
MoD Montevallo	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope, depth to rock.

See footnote at end of table.

Table 10.--Building Site Development--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
MpE*:						
Montevallo	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope, depth to rock.
Armuchee	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
MuB	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Moderate: small stones.
MuC	Moderate: too clayey, wetness, slope.	Moderate: shrink-swell, slope.	Moderate: wetness, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: small stones, slope.
MwE	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Ne	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
NkB2	Slight	Slight	Slight	Slight	Moderate: low strength.	Slight.
NkC2	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
NkD2, NmD2	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
No	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Moderate: flooding.
Pu	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, low strength, frost action.	Severe: wetness.
RaD*, RaF*:						
Ramsey	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.
Rock outcrop.						
SeB2	Moderate: depth to rock, too clayey.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Moderate: droughty.
SeC2, SeC3	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: droughty, slope.

See footnote at end of table.

Table 10.--Building Site Development--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
SeD2--Sequoia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
St--Staser	Moderate: wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Slight.
SwB--Swafford	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: low strength, wetness, flooding.	Slight.
TaE2*:						
Talbott	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Rock outcrop.						
TsB--Tasso	Moderate: too clayey.	Slight	Moderate: shrink-swell.	Slight	Moderate: low strength.	Slight.
WaC2--Waynesboro	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
WaD2--Waynesboro	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Wb--Whitesburg	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding.	Moderate: flooding.

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 11.--Sanitary Facilities

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AeC. Arents					
AnC2 Allen	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
AnD2, AnE Allen	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
ArD2, ArE3, ArF2 Armuchee	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
Be Beason	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, wetness.
BoD, BoF Bouldin	Severe: slope, slippage.	Severe: seepage, slope.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Poor: large stones, slope.
CoB2 Collegedale	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
CoC2, CoC3 Collegedale	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
CoD2 Collegedale	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: slope, too clayey, hard to pack.
CtD2*: Collegedale	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
Talbott	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
Rock outcrop.					
CtE2*: Collegedale	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: slope, too clayey, hard to pack.

See footnote at end of table.

Table 11.--Sanitary Facilities--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
CtE2*:					
Talbott	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
Rock outcrop.					
DaC2	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, small stones.
DaD2, DaD3, DaE3, DaF2	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, small stones.
Dandridge					
DcB2	Slight	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
Decatur					
DeC2, DeC3	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
Dewey					
DeD2, DeD3	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Dewey					
DfD2*:					
Dewey	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
Rock outcrop.					
Dm*.					
Dumps					
DuB2	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
Dunmore					
DuC2, DuC3	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
Dunmore					
DuD2, DuD3, DuE2, DuE3	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Dunmore					
DwE3*, DxE2*:					
Dunmore	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.

See footnote at end of table.

Table 11.--Sanitary Facilities--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
DwE3*, DxE2*:					
Fullerton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
Em	Moderate: flooding, wetness, percs slowly.	Severe: flooding.	Severe: wetness.	Moderate: flooding.	Fair: too clayey.
En	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage, large stones.	Severe: flooding, seepage.	Poor: large stones.
EtB	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
EtC	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey.
EtD	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
FaE2	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
FuC2	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Poor: small stones.
FuD2, FuE2	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
GpD2, GpF	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Poor: slope, area reclaim, thin layer.
GuE3*:					
Gullied land.					
Dandridge	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, small stones.
Ln	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
MnC	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, small stones.

See footnote at end of table.

Table 11.--Sanitary Facilities--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
MoC Montevallo	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: small stones, depth to rock.
MoD Montevallo	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
MpE*: Montevallo	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
Armuchee	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
MuB Muse	Severe: percs slowly.	Moderate: depth to rock, slope, wetness.	Severe: depth to rock, wetness.	Moderate: depth to rock, wetness.	Poor: too clayey, hard to pack.
MuC Muse	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, wetness.	Moderate: depth to rock, wetness, slope.	Poor: too clayey, hard to pack.
MwE Muskingum	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Poor: slope.
Ne Newark	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
NkB2 Nolichucky	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, small stones.
NkC2 Nolichucky	Moderate: percs slowly, slope.	Severe: slope.	Moderate: too clayey, slope.	Moderate: slope.	Fair: too clayey, small stones.
NkD2, NmD2 Nolichucky	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
No Nolin	Severe: flooding, wetness.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
Pu Purdy	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: wetness, too clayey, hard to pack.

See footnote at end of table.

Table 11.--Sanitary Facilities--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
RaD*, RaF*:					
Ramsey	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, slope.
Rock outcrop.					
SeB2					
Sequoia	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
SeC2, SeC3					
Sequoia	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
SeD2					
Sequoia	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
St					
Staser	Severe: wetness.	Severe: seepage, flooding, wetness.	Severe: seepage, wetness.	Severe: seepage.	Good.
SwB					
Swafford	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: flooding, wetness, too clayey.	Moderate: flooding, wetness.	Fair: too clayey, wetness.
TaE2*:					
Talbott	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
Rock outcrop.					
TsB					
Tasso	Severe: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
WaC2					
Waynesboro	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
WaD2					
Waynesboro	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Wb					
Whitesburg	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, depth to rock, wetness.	Severe: flooding, wetness.	Fair: depth to rock, too clayey, wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 12.--Construction Materials

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AeC. Arents				
AnC2 Allen	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
AnD2 Allen	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
AnE Allen	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
ArD2 Armuchee	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, slope.
ArE3, ArF2 Armuchee	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, slope.
Be Beason	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
BoD Bouldin	Fair: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
BoF Bouldin	Poor: slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
CoB2, CoC2, CoC3 Collegedale	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
CoD2 Collegedale	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
CtD2*:				
Collegedale	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Talbott	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Rock outcrop.				

See footnote at end of table.

Table 12.--Construction Materials--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
CtE2*:				
Collegedale	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Talbott	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Rock outcrop.				
DaC2, DaD2, DaD3	Poor:
Dandridge	depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, too clayey, small stones.
DaE3, DaF2	Poor:
Dandridge	depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, too clayey, small stones.
DcB2	Fair:
Decatur	low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
DeC2, DeC3	Poor:
Dewey	low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
DeD2, DeD3	Poor:
Dewey	low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
DfD2*:				
Dewey	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Rock outcrop.				
Dm*.				
Dumps				
DuB2, DuC2, DuC3	Fair:
Dunmore	shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.
DuD2, DuD3	Fair:
Dunmore	shrink-swell, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, slope.
DuE2, DuE3	Poor:
Dunmore	slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, slope.
DwE3*, DxE2*:				
Dunmore	Fair: shrink-swell, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, slope.

See footnote at end of table.

Table 12.--Construction Materials--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
DwE3*, DxE2*:				
Fullerton	Fair: shrink-swell, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
Em	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
Emory				
En	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, area reclaim.
Ennis				
EtB	Fair: low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
Etowah				
EtC	Fair: low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey, slope.
Etowah				
EtD	Fair: low strength, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Etowah				
FaE2	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope, area reclaim.
Farragut				
FuC2	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
Fullerton				
FuD2	Fair: shrink-swell, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
Fullerton				
FuE2	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
Fullerton				
GpD2	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Gilpin				
GpF	Poor: thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Gilpin				
GuE3*:				
Gullied land.				

See footnote at end of table.

Table 12.--Construction Materials--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
GuE3*:				
Dandridge	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, too clayey, small stones.
Ln	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Lindside				
MnC	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Minvale				
MoC	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, depth to rock.
Montevallo				
MoD	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, depth to rock, slope.
Montevallo				
MpE*:				
Montevallo	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, depth to rock, slope.
Armuchee	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, slope.
MuB, MuC	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Muse				
MwE	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Muskingum				
Ne	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Newark				
NkB2, NkC2	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Nolichucky				
NkD2, NmD2	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Nolichucky				
No	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, area reclaim.
Nolin				
Pu	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, too clayey.
Purdy				

See footnote at end of table.

Table 12.--Construction Materials--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
RaD*:				
Ramsey	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Rock outcrop.				
RaF*:				
Ramsey	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Rock outcrop.				
SeB2, SeC2, SeC3	Poor:	Improbable:	Improbable:	Poor:
Sequoia	depth to rock, low strength.	excess fines.	excess fines.	too clayey.
SeD2	Poor:	Improbable:	Improbable:	Poor:
Sequoia	depth to rock, low strength.	excess fines.	excess fines.	too clayey, slope.
St	Good	Improbable:	Improbable:	Poor:
Staser		excess fines.	excess fines.	small stones, area reclaim.
SwB	Fair:	Improbable:	Improbable:	Fair:
Swafford	low strength, wetness.	excess fines.	excess fines.	too clayey.
TaE2*:				
Talbott	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Rock outcrop.				
TsB	Poor:	Improbable:	Improbable:	Poor:
Tasso	low strength.	excess fines.	excess fines.	small stones.
WaC2	Fair:	Improbable:	Improbable:	Poor:
Waynesboro	low strength.	excess fines.	excess fines.	too clayey.
WaD2	Fair:	Improbable:	Improbable:	Poor:
Waynesboro	low strength, slope.	excess fines.	excess fines.	too clayey, slope.
Wb	Poor:	Improbable:	Improbable:	Fair:
Whitesburg	low strength.	excess fines.	excess fines.	too clayey, small stones.

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 13.--Water Management

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
AeC. Arents						
AnC2, AnD2--- Allen	Moderate: seepage.	Severe: piping.	Deep to water	Slope---	Slope---	Slope.
AnE--- Allen	Severe: slope.	Severe: piping.	Deep to water	Slope---	Slope---	Slope.
ArD2, ArE3, ArF2-- Armuchee	Severe: slope.	Severe: hard to pack.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock, erodes easily.	Slope, erodes easily, droughty.
Be--- Beason	Slight---	Severe: wetness.	Flooding---	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Wetness, erodes easily.
BoD, BoF--- Bouldin	Severe: seepage, slope.	Severe: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
CoB2--- Collegedale	Slight---	Severe: hard to pack.	Deep to water	Percs slowly, slope, erodes easily.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
CoC2--- Collegedale	Slight---	Severe: hard to pack.	Deep to water	Percs slowly, slope, erodes easily.	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
CoC3--- Collegedale	Slight---	Severe: hard to pack.	Deep to water	Slow intake, percs slowly, slope.	Slope, percs slowly.	Slope, percs slowly.
CoD2--- Collegedale	Slight---	Severe: hard to pack.	Deep to water	Percs slowly, slope, erodes easily.	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
CtD2*: Collegedale---	Slight---	Severe: hard to pack.	Deep to water	Percs slowly, slope, erodes easily.	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
Talbott---	Moderate: depth to rock.	Severe: hard to pack.	Deep to water	Depth to rock, slope.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Rock outcrop.						
CtE2*: Collegedale---	Severe: slope.	Severe: hard to pack.	Deep to water	Percs slowly, slope, erodes easily.	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.

See footnote at end of table.

Table 13.--Water Management--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
CtE2*:						
Talbott	Severe: slope.	Severe: hard to pack.	Deep to water	Depth to rock, slope.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Rock outcrop.						
DaC2, DaD2, DaD3--Dandridge	Severe: depth to rock.	Severe: thin layer.	Deep to water	Droughty, depth to rock, slope.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
DaE3, DaF2--Dandridge	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock, slope.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
DcB2--Decatur	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Favorable	Favorable.
DeC2, DeC3, DeD2, DeD3--Dewey	Slight	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
DfD2*:						
Dewey	Slight	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
Rock outcrop.						
Dm*.						
Dumps						
DuB2--Dunmore	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Favorable	Favorable.
DuC2, DuC3, DuD2, DuD3--Dunmore	Slight	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
DuE2, DuE3--Dunmore	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
DwE3*, DxE2*:						
Dunmore	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
Fullerton	Severe: slope.	Severe: piping, hard to pack.	Deep to water	Slope	Slope, large stones.	Large stones, slope.
Em--Emory	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
En--Ennis	Severe: seepage.	Severe: piping.	Deep to water	Large stones, droughty.	Large stones	Large stones, droughty.
EtB--Etowah	Moderate: seepage.	Moderate: thin layer, piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.

See footnote at end of table.

Table 13.--Water Management--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
EtC, EtD Etowah	Moderate: seepage.	Moderate: thin layer, piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
FaE2 Farragut	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
FuC2, FuD2 Fullerton	Slight	Severe: piping, hard to pack.	Deep to water	Slope	Slope, large stones.	Large stones, slope.
FuE2 Fullerton	Severe: slope.	Severe: piping, hard to pack.	Deep to water	Slope	Slope, large stones.	Large stones, slope.
GpD2, GpF Gilpin	Severe: slope.	Severe: thin layer.	Deep to water	Slope, depth to rock.	Slope, depth to rock, large stones.	Slope, depth to rock, large stones.
GuE3*: Gullied land.						
GuE3*: Dandridge	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock, slope.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Ln Lindside	Moderate: seepage.	Severe: piping.	Flooding, frost action.	Flooding, wetness, erodes easily.	Wetness, erodes easily.	Erodes easily.
MnC Minvale	Moderate: seepage.	Severe: piping.	Deep to water	Slope	Slope	Slope.
MoC Montevallo	Severe: depth to rock.	Severe: thin layer.	Deep to water	Droughty, depth to rock, slope.	Depth to rock	Droughty, depth to rock.
MoD Montevallo	Severe: depth to rock.	Severe: thin layer.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.	Slope, droughty, depth to rock.
MpE*: Montevallo	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.	Slope, droughty, depth to rock.
Armuchee	Severe: slope.	Severe: hard to pack.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock, erodes easily.	Slope, erodes easily, droughty.
MuB Muse	Moderate: depth to rock.	Moderate: hard to pack, thin layer.	Deep to water	Percs slowly, slope, erodes easily.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
MuC Muse	Moderate: depth to rock.	Moderate: hard to pack, thin layer.	Deep to water	Percs slowly, slope, erodes easily.	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.

See footnote at end of table.

Table 13.--Water Management--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
MwE---------- Muskingum	Severe: slope.	Severe: piping.	Not needed----	Slope, seepage.	Slope, piping.	Slope, erodes easily.
Ne---------- Newark	Moderate: seepage.	Severe: piping, wetness.	Flooding, frost action.	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Wetness, erodes easily.
NkB2---------- Nolichucky	Moderate: seepage.	Slight---------	Deep to water	Slope----------	Favorable------	Favorable.
NkC2, NkD2, NmD2-- Nolichucky	Moderate: seepage.	Slight---------	Deep to water	Slope----------	Slope----------	Slope.
No---------- Nolin	Severe: seepage.	Severe: piping.	Deep to water	Erodes easily, flooding.	Erodes easily	Erodes easily.
Pu---------- Purdy	Slight---------	Severe: piping, hard to pack, wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
RaD*, RaF*: Ramsey----------	Severe: depth to rock, slope.	Severe: piping.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.	Slope, droughty, depth to rock.
Rock outcrop.						
SeB2---------- Sequoia	Moderate: depth to rock.	Severe: hard to pack.	Deep to water	Slope, depth to rock.	Depth to rock, erodes easily.	Erodes easily, droughty.
SeC2---------- Sequoia	Moderate: depth to rock.	Severe: hard to pack.	Deep to water	Slope, depth to rock.	Slope, depth to rock, erodes easily.	Slope, erodes easily, droughty.
SeC3---------- Sequoia	Moderate: depth to rock.	Severe: hard to pack.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, droughty.
SeD2---------- Sequoia	Moderate: depth to rock.	Severe: hard to pack.	Deep to water	Slope, depth to rock.	Slope, depth to rock, erodes easily.	Slope, erodes easily, droughty.
St---------- Staser	Severe: seepage.	Severe: piping.	Deep to water	Favorable------	Favorable------	Favorable.
SwB---------- Swafford	Moderate: seepage.	Severe: piping.	Favorable-----	Wetness, erodes easily.	Erodes easily, wetness.	Erodes easily.
TaE2*: Talbott----------	Severe: slope.	Severe: hard to pack.	Deep to water	Depth to rock, slope.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Rock outcrop.						
TsB---------- Tasso	Moderate: seepage.	Moderate: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.

See footnote at end of table.

Table 13.--Water Management--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
WaC2, WaD2-------- Waynesboro	Slight---------	Severe: piping, hard to pack.	Deep to water	Slope----------	Slope----------	Slope.
Wb---------------- Whitesburg	Moderate: seepage, depth to rock.	Moderate: thin layer, piping, wetness.	Flooding------	Wetness, flooding.	Wetness--------	Favorable.

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 14.--Engineering Index Properties

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
AeC.											
Arents											
AnC2, AnD2, AnE--	0-11	Sandy loam-------	ML, CL-ML, SM, SC-SM	A-4	0-5	90-100	75-100	65-98	40-80	<26	NP-10
Allen	11-16	Clay loam, sandy clay loam, loam.	CL-ML, CL, SC	A-4, A-6, A-7-6	0-10	85-100	75-100	65-98	40-80	20-43	4-19
	16-65	Clay loam, sandy clay loam, clay.	CL-ML, CL, SC, SC-SM	A-4, A-6, A-7-6	0-10	85-100	70-98	60-95	45-80	21-48	5-22
ArD2----------	0-10	Channery silt loam.	CL, ML, CL-ML	A-4, A-6	0-2	70-80	65-75	60-70	50-65	25-39	5-15
Armuchee	10-18	Channery silty clay, channery silty clay loam.	ML, CL, CH	A-6, A-7	0-2	65-85	60-80	55-80	50-70	37-65	16-35
	18-24	Very channery silty clay, very channery silty clay loam.	GC, CL, CH	A-2, A-6, A-7	0-5	35-75	25-70	20-65	15-55	35-60	13-30
	24-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
ArE3----------	0-6	Channery silty clay loam.	CL, ML, CL-ML	A-4, A-6	0-2	70-80	65-75	60-70	50-65	25-39	5-15
Armuchee	6-14	Channery silty clay, channery silty clay loam.	ML, CL, CH	A-6, A-7	0-2	65-85	60-80	55-80	50-70	37-65	16-35
	14-20	Very channery silty clay, very channery silty clay loam.	GC, CL, CH	A-2, A-6, A-7	0-5	35-75	25-70	20-65	15-55	35-60	13-30
	20-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
ArF2----------	0-10	Channery silt loam.	CL, ML, CL-ML	A-4, A-6	0-2	70-80	65-75	60-70	50-65	25-39	5-15
Armuchee	10-18	Channery silty clay, channery silty clay loam.	ML, CL, CH	A-6, A-7	0-2	65-85	60-80	55-80	50-70	37-65	16-35
	18-24	Very channery silty clay, very channery silty clay loam.	GC, CL, CH	A-2, A-6, A-7	0-5	35-75	25-70	20-65	15-55	35-60	13-30
	24-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Be----------	0-14	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	100	95-100	90-100	75-90	25-40	5-15
Beason	14-25	Silty clay loam, silt loam.	CL	A-6	0	100	95-100	90-100	80-95	25-40	11-20
	25-46	Silty clay loam, silty clay, clay.	CL	A-6, A-7	0	100	95-100	90-95	80-95	30-49	11-25
	46-60	Variable---------	---	---	---	---	---	---	---	---	---

See footnote at end of table.

Table 14.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
BoD, BoF--------- Bouldin	0-9	Stony sandy loam, cobbly sandy loam.	SM, ML, SC-SM, GM	A-2, A-4	10-30	65-85	55-85	40-65	30-55	15-25	2-7
	9-65	Extremely stony clay loam, very stony sandy clay loam, very cobbly clay loam, extremely cobbly clay loam.	GC, SC	A-2, A-4, A-6	30-55	55-75	45-65	35-60	25-50	25-39	8-16
CoB2, CoC2------- Collegedale	0-8	Silt loam, silty clay loam.	ML, CL-ML, CL	A-4, A-6	0-2	90-100	85-100	75-95	70-90	24-39	5-16
	8-65	Silty clay, clay	MH, CH, CL	A-7	0-2	95-100	90-100	80-95	75-95	41-75	18-42
CoC3------------- Collegedale	0-3	Silty clay loam	CL, ML, CH, MH	A-6, A-7	0-2	95-100	90-100	80-95	75-95	34-55	12-28
	3-65	Clay, silty clay	MH, CH, CL	A-7	0-2	95-100	90-100	80-95	75-95	41-75	18-42
CoD2------------- Collegedale	0-8	Silt loam, silty clay loam.	ML, CL-ML, CL	A-4, A-6	0-2	90-100	85-100	75-95	70-90	24-39	5-16
	8-65	Silty clay, clay	MH, CH, CL	A-7	0-2	95-100	90-100	80-95	75-95	41-75	18-42
CtD2*, CtE2*:											
Collegedale----- Talbott--------- Rock outcrop.	0-8	Silt loam, silty clay loam.	ML, CL-ML, CL	A-4, A-6	0-2	90-100	85-100	75-95	70-90	24-39	5-16
	8-65	Silty clay, clay	MH, CH, CL	A-7	0-2	95-100	90-100	80-95	75-95	41-75	18-42
	0-7	Silt loam, silty clay loam.	CL	A-4, A-6	0-5	95-100	90-100	85-95	75-95	25-40	8-16
	7-32	Clay, silty clay	CL, MH, CH	A-7	0-10	95-100	90-100	85-95	80-95	41-80	20-45
	32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
DaC2, DaD2------- Dandridge	0-3	Channery silt loam.	CL, GC, SC	A-6, A-4	5-15	35-90	35-80	35-75	35-70	25-40	8-20
	3-17	Channery silty clay loam, channery silty clay, very channery silty clay loam.	GC	A-7, A-6, A-2	15-20	25-50	25-50	15-45	15-40	35-60	15-35
	17-35	Weathered bedrock	---	---	---	---	---	---	---	---	---
DaD3, DaE3------- Dandridge	0-5	Channery silty clay loam.	CL, GC, SC	A-6, A-4	5-15	35-90	35-80	35-75	35-70	25-40	8-20
	5-13	Channery silty clay loam, channery silty clay, very channery silty clay loam.	GC	A-7, A-6, A-2	15-20	25-50	25-50	15-45	15-40	35-60	15-35
	13-25	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

Table 14.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
DaF2---------- Dandridge	0-3	Channery silt loam.	CL, GC, SC	A-6, A-4	5-15	35-90	35-80	35-75	35-70	25-40	8-20
	3-17	Channery silty clay loam, channery silty clay, very channery silty clay loam.	GC	A-7, A-6, A-2	15-20	25-50	25-50	15-45	15-40	35-60	15-35
	17-35	Weathered bedrock	---	---	---	---	---	---	---	---	---
DcB2---------- Decatur	0-11	Silt loam--------	CL, ML, CL-ML	A-4, A-6	0-3	90-100	90-98	85-98	65-80	<32	NP-12
	11-33	Silty clay loam, silty clay, clay.	ML, CL	A-7, A-4, A-6, A-5	0-3	90-100	90-100	88-99	78-92	30-49	8-22
	33-65	Clay, silty clay.	CL, ML, MH, CH	A-7, A-6	0-3	90-100	90-100	88-98	75-90	37-60	11-28
DeC2---------- Dewey	0-10	Silt loam--------	CL-ML, CL	A-4, A-6	0	90-100	80-100	75-95	65-80	24-30	5-11
	10-34	Clay, silty clay, silty clay loam.	CL	A-6	0	90-100	80-100	75-95	70-85	27-40	12-20
	34-65	Clay, silty clay	CH, CL, MH, ML	A-6, A-7	0-2	85-100	75-100	70-95	65-85	38-68	12-34
DeC3---------- Dewey	0-4	Silty clay loam	CL	A-6	0	90-100	80-100	75-95	70-80	25-39	12-20
	4-28	Clay, silty clay, silty clay loam.	CL	A-6	0	90-100	80-100	75-95	70-85	27-40	12-20
	28-65	Clay, silty clay	CH, CL, MH, ML	A-6, A-7	0-2	85-100	75-100	70-95	65-85	38-68	12-34
DeD2---------- Dewey	0-10	Silt loam--------	CL-ML, CL	A-4, A-6	0	90-100	80-100	75-95	65-80	24-30	5-11
	10-34	Clay, silty clay, silty clay loam.	CL	A-6	0	90-100	80-100	75-95	70-85	27-40	12-20
	34-65	Clay, silty clay	CH, CL, MH, ML	A-6, A-7	0-2	85-100	75-100	70-95	65-85	38-68	12-34
DeD3---------- Dewey	0-4	Silty clay loam	CL	A-6	0	90-100	80-100	75-95	70-80	25-39	12-20
	4-28	Clay, silty clay, silty clay loam.	CL	A-6	0	90-100	80-100	75-95	70-85	27-40	12-20
	28-65	Clay, silty clay	CH, CL, MH, ML	A-6, A-7	0-2	85-100	75-100	70-95	65-85	38-68	12-34
DfD2*:											
Dewey----------	0-10	Silt loam--------	CL	A-6	0	90-100	80-100	75-95	70-80	25-39	12-20
	10-34	Clay, silty clay, silty clay loam.	CL	A-6	0	90-100	80-100	75-95	70-85	27-40	12-20
	34-65	Clay, silty clay	CH, CL, MH, ML	A-6, A-7	0-2	85-100	75-100	70-95	65-85	38-68	12-34
Rock outcrop.											
Dm*. Dumps											
DuB2, DuC2------- Dunmore	0-10	Silt loam, silty clay loam.	CL-ML, CL, ML	A-4, A-6	0-5	80-100	75-90	65-80	60-75	18-30	3-11
	10-65	Clay, silty clay	MH, CH	A-7	0-5	85-100	75-95	70-95	65-95	50-70	20-36
DuC3---------- Dunmore	0-4	Silty clay loam	CL	A-6, A-7	0-5	85-100	75-95	70-95	65-90	32-44	12-20
	4-65	Clay, silty clay	MH, CH	A-7	0-5	85-100	75-95	70-95	65-95	50-70	20-36

See footnote at end of table.

Table 14.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
DuD2---------- Dunmore	0-10	Silt loam, silty clay loam.	CL-ML, CL, ML	A-4, A-6	0-5	80-100	75-90	65-80	60-75	18-30	3-11
	10-65	Clay, silty clay	MH, CH	A-7	0-5	85-100	75-95	70-95	65-95	50-70	20-36
DuD3---------- Dunmore	0-4	Silty clay loam	CL	A-6, A-7	0-5	85-100	75-95	70-95	65-90	32-44	12-20
	4-65	Clay, silty clay	MH, CH	A-7	0-5	85-100	75-95	70-95	65-95	50-70	20-36
DuE2---------- Dunmore	0-10	Silt loam, silty clay loam.	CL-ML, CL, ML	A-4, A-6	0-5	80-100	75-90	65-80	60-75	18-30	3-11
	10-65	Clay, silty clay	MH, CH	A-7	0-5	85-100	75-95	70-95	65-95	50-70	20-36
DuE3---------- Dunmore	0-4	Silty clay loam	CL	A-6, A-7	0-5	85-100	75-95	70-95	65-90	32-44	12-20
	4-65	Clay, silty clay	MH, CH	A-7	0-5	85-100	75-95	70-95	65-95	50-70	20-36
DwE3*:											
Dunmore---------	0-10	Silty clay loam	CL	A-6, A-7	0-5	85-100	75-95	70-95	65-90	32-44	12-20
	10-65	Clay, silty clay	MH, CH	A-7	0-5	85-100	75-95	70-95	65-95	50-70	20-36
DwE3*:											
Fullerton-------	0-8	Gravelly silty clay loam.	CL, ML, SC, GC	A-2, A-6, A-4	2-18	60-90	45-80	40-75	30-70	20-40	3-17
	8-17	Gravelly silty clay loam.	CL, GC, SC, ML	A-2, A-4, A-6, A-7	2-18	60-90	45-80	40-75	30-70	29-42	8-17
	17-65	Gravelly clay, gravelly silty clay.	MH, ML, GM, SM	A-2, A-7	2-18	60-90	45-80	40-75	30-75	48-78	20-42
DxE2*:											
Dunmore---------	0-10	Silt loam, silty clay loam.	CL-ML, CL, ML	A-4, A-6	0-5	80-100	75-90	65-80	60-75	18-30	3-11
	10-65	Clay, silty clay	MH, CH	A-7	0-5	85-100	75-95	70-95	65-95	50-70	20-36
Fullerton-------	0-8	Gravelly silt loam.	GM-GC, CL-ML, CL, GC	A-2, A-4	2-15	60-94	45-80	40-75	30-70	18-30	3-10
	8-17	Gravelly silty clay loam.	CL, GC, SC, ML	A-2, A-4, A-6, A-7	2-18	60-90	45-80	40-75	30-70	29-42	8-17
	17-65	Gravelly clay, gravelly silty clay.	MH, ML, GM, SM	A-2, A-7	2-18	60-90	45-80	40-75	30-75	48-78	20-42
Em---------- Emory	0-7	Silt loam--------	CL, ML, CL-ML	A-4, A-6	0-2	95-100	90-100	85-100	80-95	25-40	4-15
	7-52	Silt loam, silty clay loam.	CL, ML, CL-ML	A-4, A-6	0-2	95-100	90-100	85-100	80-95	25-40	4-15
	52-60	Silty clay loam, silt loam, silty clay.	CL	A-4, A-6, A-7	0-2	90-100	75-100	70-100	65-95	25-45	9-20
En---------- Ennis	0-8	Cobbly loam------	CL-ML, ML, SM, GM	A-4	20-35	75-95	70-90	55-80	36-65	<30	NP-10
	8-30	Cobbly silt loam, cobbly loam, cobbly sandy loam.	CL-ML, ML, SM, GM	A-4	20-35	75-95	70-90	55-80	36-65	<30	NP-10
	30-60	Cobbly loam, very cobbly loam, very cobbly sandy loam.	SC-SM, SM, GM	A-2	25-45	65-90	60-85	45-70	25-50	<30	NP-8

See footnote at end of table.

Table 14.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
EtB, EtC, EtD---- Etowah	0-10	Silt loam--------	ML, CL, SC-SM, CL-ML	A-4	0	80-100	75-100	70-95	45-70	20-30	3-10
	10-40	Silty clay loam, clay loam, silt loam.	CL	A-6	0	80-100	75-100	70-95	65-85	25-35	10-15
	40-65	Silty clay loam, clay loam, clay.	CL, ML, MH	A-6, A-7	0	80-100	75-100	70-95	65-85	39-60	15-25
FaE2------------- Farragut	0-6	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	95-100	95-100	90-100	70-90	20-35	3-15
	6-51	Clay, silty clay, silty clay loam.	CL, MH, CH	A-6, A-7	0	90-100	85-100	80-95	70-90	35-65	15-35
	51-65	Channery silty clay, channery silty clay loam.	CL, CH, GC	A-6, A-7, A-2	0-5	40-65	35-65	30-60	25-55	35-51	12-24
FuC2, FuD2, FuE2- Fullerton	0-8	Gravelly silt loam.	GM-GC, CL-ML, CL, GC	A-2, A-4	2-15	60-94	45-80	40-75	30-70	18-30	3-10
	8-17	Gravelly silty clay loam.	CL, GC, SC, ML	A-2, A-4, A-6, A-7	2-18	60-90	45-80	40-75	30-70	29-42	8-17
	17-65	Gravelly clay, gravelly silty clay.	MH, ML, GM, SM	A-2, A-7	2-18	60-90	45-80	40-75	30-75	48-78	20-42
GpD2, GpF-------- Gilpin	0-6	Channery silt loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-90	45-85	35-75	30-70	20-40	4-15
	6-26	Channery silt loam, silt loam, silty clay loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	26-32	Channery loam, very channery silt loam, very channery silty clay loam.	GC, GM-GC	A-1, A-2, A-4, A-6	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
GuE3*: Gullied land.											
Dandridge-------	0-5	Channery silty clay loam.	CL, GC, SC	A-6, A-4	5-15	35-90	35-80	35-75	35-70	25-40	8-20
	5-13	Channery silty clay loam, channery silty clay, very channery silty clay loam.	GC	A-7, A-6, A-2	15-20	25-50	25-50	15-45	15-40	35-60	15-35
	13-25	Weathered bedrock	---	---	---	---	---	---	---	---	---
Ln--------------- Lindside	0-10	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	100	95-100	80-100	55-90	20-35	2-15
	10-46	Silty clay loam, silt loam, very fine sandy loam.	CL, ML, CL-ML	A-4, A-6	0	100	95-100	90-100	70-95	25-40	4-18
	46-60	Stratified silty clay loam to gravelly sandy loam.	CL, ML, SM, SC	A-2, A-4, A-6	0	60-100	55-100	45-100	30-95	20-40	4-18

See footnote at end of table.

Table 14.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
MnC---------- Minvale	0-9	Gravelly silt loam.	ML, CL, GM, GC	A-4	0-5	55-80	50-75	40-70	36-60	<30	NP-10
	9-42	Gravelly silty clay loam, gravelly silt loam, gravelly loam.	CL, CL-ML, GC, GM-GC	A-4, A-6	0-5	50-75	50-75	40-70	36-65	20-40	5-15
	42-65	Gravelly silty clay loam, gravelly silty clay.	CL, ML, GC, SC	A-4, A-6, A-7	0-5	55-80	50-75	40-70	36-65	25-50	7-23
MoC, MoD---------- Montevallo	0-8	Channery silt loam.	SC-SM, SC, CL-ML, CL	A-4	0-5	60-88	50-75	45-70	40-65	<30	NP-10
	8-16	Very channery silt loam, extremely channery silt loam.	GM-GC, GC, SC-SM, SC	A-2, A-4, A-6, A-1-b	0-5	35-70	23-50	15-45	15-40	20-40	2-15
	16-38	Weathered bedrock	---	---	---	---	---	---	---	---	---
MpE*:											
Montevallo------	0-5	Channery silt loam.	SC-SM, SC, CL-ML, CL	A-4	0-5	60-88	50-75	45-70	40-65	<30	NP-10
	5-14	Very channery silt loam, extremely channery silt loam.	GM-GC, GC, SC-SM, SC	A-2, A-4, A-6, A-1-b	0-5	35-70	23-50	15-45	15-40	20-40	2-15
	14-38	Weathered bedrock	---	---	---	---	---	---	---	---	---
Armuchee--------	0-10	Channery silt loam.	CL, ML, CL-ML	A-4, A-6	0-2	70-80	65-75	60-70	50-65	25-39	5-15
	10-18	Channery silty clay, channery silty clay loam.	ML, CL, CH	A-6, A-7	0-2	65-85	60-80	55-80	50-70	37-65	16-35
	18-24	Very channery silty clay, very channery silty clay loam.	GC, CL, CH	A-2, A-6, A-7	0-5	35-75	25-70	20-65	15-55	35-60	13-30
	24-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
MuB, MuC---------- Muse	0-9	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	80-100	70-100	60-100	55-95	20-40	2-20
	9-44	Silty clay loam, silty clay, channery silty clay.	CL, CH	A-7, A-6	0	70-100	65-100	60-100	55-100	35-65	15-35
	44-60	Channery silty clay, very channery clay, clay.	MH, CH, CL, GC	A-7, A-2	0	50-100	40-95	35-95	30-95	40-75	20-40
	60-68	Weathered bedrock	---	---	---	---	---	---	---	---	---
MwE---------- Muskingum	0-8	Silt loam--------	ML, CL, SM, SC	A-2, A-4	0-10	75-100	70-95	50-90	30-80	20-35	2-10
	8-30	Silt loam, channery silt loam, channery loam.	GM, SM, ML, CL	A-2, A-4	0-15	70-90	55-85	50-80	40-75	20-35	2-10
	30-45	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

Table 14.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Ne Newark	0-6	Silt loam	ML, CL, CL-ML	A-4	0	95-100	90-100	80-100	55-95	<32	NP-10
	6-30	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0	95-100	90-100	85-100	70-100	22-42	3-20
	30-65	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-3	75-100	70-100	65-100	55-95	22-42	3-20
NkB2, NkC2, NkD2- Nolichucky	0-8	Loam	SC-SM, SC, CL, CL-ML	A-4, A-2	0-5	80-100	75-100	50-95	30-85	18-25	3-10
	8-15	Clay loam, gravelly clay loam, loam.	SC, GC, CL	A-4, A-2, A-6	0-20	60-100	55-100	45-90	20-75	25-35	8-15
	15-45	Clay loam, gravelly clay loam, sandy clay loam.	CL, SC, GC	A-6, A-7, A-2	0-20	60-100	55-100	45-95	25-85	35-45	15-22
	45-60	Clay loam, clay, gravelly clay loam.	CL, CH, SC, GC	A-6, A-7, A-2	0-20	60-100	55-100	45-95	25-90	38-55	17-30
NmD2 Nolichucky	0-8	Gravelly loam	SC-SM, SC, GC, GM-GC	A-4, A-2, A-1-b	0-20	60-75	55-75	30-70	15-50	18-25	3-10
	8-15	Clay loam, gravelly clay loam, loam.	SC, GC, CL	A-4, A-2, A-6	0-20	60-100	55-100	45-90	20-75	25-35	8-15
	15-45	Clay loam, gravelly clay loam, sandy clay loam.	CL, SC, GC	A-6, A-7, A-2	0-20	60-100	55-100	45-95	25-85	35-45	15-22
	45-60	Clay loam, clay, gravelly clay loam.	CL, CH, SC, GC	A-6, A-7, A-2	0-20	60-100	55-100	45-95	25-90	38-55	17-30
No Nolin	0-7	Silt loam	CL, CL-ML	A-4, A-6	0	100	95-100	90-100	80-100	25-40	5-18
	7-60	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6, A-7	0	100	95-100	85-100	75-100	25-46	5-23
Pu Purdy	0-12	Silt loam	ML, CL	A-4, A-6, A-7	0	95-100	90-100	90-100	90-100	25-50	4-20
	12-50	Silty clay, clay, clay loam.	CL, CH, MH	A-6, A-7	0	95-100	90-100	85-100	75-85	30-65	11-30
	50-65	Silty clay, silty clay loam, clay.	CL, CH, MH	A-6, A-7	0	95-100	90-100	85-100	70-95	30-65	11-30
RaD*, RaF*: Ramsey	0-4	Loam	SM, CL-ML, ML, SC-SM	A-4, A-2	0-10	85-100	75-95	60-75	30-70	<25	NP-7
	4-18	Loam, sandy loam, fine sandy loam.	SM, CL-ML, ML, SC-SM	A-4, A-2	0-10	85-100	75-95	60-77	30-70	<25	NP-7
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
SeB2, SeC2 Sequoia	0-5	Silt loam	CL, CL-ML	A-4, A-6	0	95-100	95-100	85-100	80-95	23-35	5-15
	5-35	Silty clay, clay, channery silty clay.	CL, MH, CH	A-7	0	70-100	65-100	60-100	55-95	43-74	20-40
	35-50	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

Table 14.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
SeC3---------- Sequoia	0-5	Silty clay loam	CL, ML, CH, MH	A-6, A-7	0	95-100	95-100	90-100	85-95	35-65	12-35
	5-30	Silty clay, clay, channery silty clay.	CL, MH, CH	A-7	0	70-100	65-100	60-100	55-95	43-74	20-40
	30-50	Weathered bedrock	---	---	---	---	---	---	---	---	---
SeD2---------- Sequoia	0-5	Silt loam--------	CL, CL-ML	A-4, A-6	0	95-100	95-100	85-100	80-95	23-35	5-15
	5-35	Silty clay, clay, channery silty clay.	CL, MH, CH	A-7	0	70-100	65-100	60-100	55-95	43-74	20-40
	35-50	Weathered bedrock	---	---	---	---	---	---	---	---	---
St---------- Staser	0-28	Fine sandy loam	CL, CL-ML, ML	A-4, A-6	0	90-100	80-100	60-85	55-80	20-35	3-15
	28-65	Silt loam, loam, fine sandy loam.	CL, CL-ML, SC, SC-SM	A-4, A-6, A-2	0-5	45-100	40-100	35-80	30-75	20-35	5-15
SwB---------- Swafford	0-14	Silt loam--------	ML, CL-ML, CL	A-4	0	90-100	85-100	75-100	55-85	20-35	2-10
	14-28	Loam, clay loam, silt loam.	CL, ML, CL-ML	A-4, A-6	0	90-100	85-100	75-95	51-80	25-40	6-16
	28-48	Loam, clay loam, silt loam.	CL, ML, CL-ML	A-4, A-6	0	90-100	85-100	75-95	51-80	25-40	6-16
	48-65	Loam, clay loam, silt loam.	CL, ML, CL-ML	A-4, A-6	0	90-100	85-100	75-95	51-80	25-40	6-16
TaE2*:											
Talbott---------	0-7	Silt loam, silty clay loam.	CL	A-4, A-6	0-5	95-100	90-100	85-95	75-95	25-40	8-16
	7-32	Clay, silty clay	CL, MH, CH	A-7	0-10	95-100	90-100	85-95	80-95	41-80	20-45
	32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
TsB---------- Tasso	0-13	Silt loam--------	ML, CL-ML, CL	A-4	0-5	90-100	80-95	70-85	60-75	20-30	3-9
	13-19	Silt loam, loam, silty clay loam.	CL	A-4, A-6	0-5	90-100	80-95	75-90	65-80	27-36	9-15
	19-33	Silty clay loam, clay loam, gravelly silty clay loam.	CL	A-4, A-6	0-5	70-100	65-95	60-90	50-85	27-36	9-15
	33-65	Clay, clay loam, silty clay loam.	CL, ML, MH, CH	A-6, A-7	0-15	80-100	70-95	65-90	55-85	35-55	14-25
WaC2, WaD2------- Waynesboro	0-6	Loam----------	ML, CL-ML, CL, SM	A-4	0-5	85-100	80-100	70-95	43-70	18-30	2-9
	6-34	Clay loam, sandy clay loam.	CL, SC	A-4, A-6, A-7	0-5	90-100	85-100	75-95	45-75	30-41	9-17
	34-65	Clay loam, sandy clay, clay.	MH, CL, ML	A-4, A-6, A-7	0-5	90-100	80-100	70-98	55-75	35-68	9-32
Wb---------- Whitesburg	0-7	Silt loam--------	CL, CL-ML, ML	A-4, A-6	0	80-100	75-100	70-95	55-85	20-35	3-13
	7-41	Silty clay loam, silt loam, clay loam.	CL	A-4, A-6	0	80-100	75-100	70-95	65-95	25-40	8-16
	41-50	Weathered bedrock	---	---	---	---	---	---	---	---	---

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 15.--Physical and Chemical Properties of the Soils

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
AeC.										
Arents										
AnC2, AnD2, AnE--	0-11	6-25	1.30-1.50	0.6-2.0	0.14-0.19	4.5-5.5	Low	0.28	5	.5-2
Allen	11-16	18-35	1.40-1.60	0.6-2.0	0.12-0.17	4.5-5.5	Low	0.20		
	16-65	20-45	1.40-1.60	0.6-2.0	0.10-0.17	4.5-5.5	Low	0.20		
ArD2	0-10	22-32	1.35-1.45	0.6-2.0	0.12-0.17	4.5-5.5	Low	0.28	3	.5-2
Armuchee	10-18	37-47	1.40-1.50	0.2-0.6	0.10-0.14	4.5-5.5	Moderate	0.37		
	18-24	35-45	1.40-1.50	0.2-0.6	0.05-0.10	4.5-5.5	Moderate	0.32		
	24-60	---	---	---	---	---	---	---		
ArE3	0-6	22-32	1.35-1.45	0.6-2.0	0.12-0.17	4.5-5.5	Low	0.28	3	<1
Armuchee	6-14	37-47	1.40-1.50	0.2-0.6	0.10-0.14	4.5-5.5	Moderate	0.37		
	14-20	35-45	1.40-1.50	0.2-0.6	0.05-0.10	4.5-5.5	Moderate	0.32		
	20-60	---	---	---	---	---	---	---		
ArF2	0-10	22-32	1.35-1.45	0.6-2.0	0.12-0.17	4.5-5.5	Low	0.28	3	.5-2
Armuchee	10-18	37-47	1.40-1.50	0.2-0.6	0.10-0.14	4.5-5.5	Moderate	0.37		
	18-24	35-45	1.40-1.50	0.2-0.6	0.05-0.10	4.5-5.5	Moderate	0.32		
	24-60	---	---	---	---	---	---	---		
Be	0-14	22-35	1.35-1.55	0.6-2.0	0.17-0.20	4.5-6.0	Low	0.37	5	1-2
Beason	14-25	26-40	1.40-1.60	0.6-2.0	0.17-0.20	4.5-5.5	Low	0.32		
	25-46	35-45	1.45-1.65	0.2-0.6	0.14-0.18	4.5-5.5	Low	0.32		
	46-60	---	---	---	---	---	---	---		
BoD, BoF	0-9	10-20	1.35-1.50	2.0-6.0	0.06-0.10	4.5-5.5	Low	0.20	5	.5-2
Bouldin	9-65	17-35	1.40-1.55	2.0-6.0	0.06-0.10	4.5-5.5	Low	0.20		
CoB2, CoC2	0-8	20-35	1.30-1.50	0.6-2.0	0.18-0.22	4.5-5.5	Low	0.37	5	.5-2
Collegedale	8-65	40-60	1.45-1.60	0.2-0.6	0.12-0.16	4.5-5.5	Moderate	0.24		
CoC3	0-5	35-45	1.40-1.60	0.2-0.6	0.14-0.20	4.5-5.5	Moderate	0.28	5	<1
Collegedale	5-65	40-60	1.50-1.70	0.2-0.6	0.12-0.16	4.5-5.5	Moderate	0.24		
CoD2	0-8	20-35	1.30-1.50	0.6-2.0	0.18-0.22	4.5-5.5	Low	0.37	5	.5-2
Collegedale	8-65	40-60	1.45-1.60	0.2-0.6	0.12-0.16	4.5-5.5	Moderate	0.24		
CtD2*, CtE2*:										
Collegedale	0-8	20-35	1.30-1.50	0.6-2.0	0.18-0.22	4.5-5.5	Low	0.37	5	.5-2
	8-65	40-60	1.45-1.60	0.2-0.6	0.12-0.16	4.5-5.5	Moderate	0.24		
Talbott	0-7	15-27	1.35-1.50	0.6-2.0	0.10-0.18	5.1-6.0	Moderate	0.37	2	.5-2
	7-32	40-60	1.40-1.60	0.2-0.6	0.10-0.14	5.1-6.0	Moderate	0.24		
	32	---	---	---	---	---	---	---		
Rock outcrop.										
DaC2, DaD2	0-3	25-45	1.40-1.50	0.6-2.0	0.08-0.14	6.1-7.8	Low	0.17	1	.5-2
Dandridge	3-17	35-50	1.40-1.55	0.2-0.6	0.06-0.10	6.1-7.8	Moderate	0.17		
	17-35	---	---	---	---	---	---	---		
DaD3, DaE3	0-5	25-45	1.40-1.50	0.6-2.0	0.08-0.14	6.1-7.8	Low	0.17	1	<1
Dandridge	5-13	35-50	1.40-1.55	0.2-0.6	0.06-0.10	6.1-7.8	Moderate	0.17		
	13-25	---	---	---	---	---	---	---		

See footnote at end of table.

Table 15.--Physical and Chemical Properties of the Soils--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
DaF2--------	0-3	25-45	1.40-1.50	0.6-2.0	0.08-0.14	6.1-7.8	Low----------	0.17	1	.5-2
Dandridge	3-17	35-50	1.40-1.55	0.2-0.6	0.06-0.10	6.1-7.8	Moderate-----	0.17		
	17-35	---	---	---	---	---	----------	----		
DcB2--------	0-11	15-27	1.25-1.55	0.6-2.0	0.18-0.20	4.5-6.0	Low----------	0.32	5	.5-2
Decatur	11-33	35-60	1.20-1.55	0.6-2.0	0.14-0.17	4.5-6.0	Moderate-----	0.28		
	33-65	35-60	1.20-1.50	0.6-2.0	0.12-0.16	4.5-6.0	Moderate-----	0.24		
DeC2--------	0-10	17-27	1.35-1.50	0.6-2.0	0.18-0.20	4.5-5.5	Low----------	0.32	5	.5-2
Dewey	10-34	35-50	1.45-1.55	0.6-2.0	0.12-0.18	4.5-5.5	Moderate-----	0.24		
	34-65	45-60	1.45-1.55	0.6-2.0	0.12-0.17	4.5-5.5	Moderate-----	0.24		
DeC3--------	0-4	32-45	1.40-1.50	0.6-2.0	0.14-0.19	4.5-5.5	Low----------	0.28	5	<1
Dewey	4-28	35-50	1.45-1.55	0.6-2.0	0.12-0.18	4.5-5.5	Moderate-----	0.24		
	28-65	45-60	1.45-1.55	0.6-2.0	0.12-0.17	4.5-5.5	Moderate-----	0.24		
DeD2--------	0-10	17-27	1.35-1.50	0.6-2.0	0.18-0.20	4.5-5.5	Low----------	0.32	5	.5-2
Dewey	10-34	35-50	1.45-1.55	0.6-2.0	0.12-0.18	4.5-5.5	Moderate-----	0.24		
	34-65	45-60	1.45-1.55	0.6-2.0	0.12-0.17	4.5-5.5	Moderate-----	0.24		
DeD3--------	0-4	32-45	1.40-1.50	0.6-2.0	0.14-0.19	4.5-5.5	Low----------	0.28	5	<1
Dewey	4-28	35-50	1.45-1.55	0.6-2.0	0.12-0.18	4.5-5.5	Moderate-----	0.24		
	28-65	45-60	1.45-1.55	0.6-2.0	0.12-0.17	4.5-5.5	Moderate-----	0.24		
DfD2*:										
Dewey-----------	0-10	32-45	1.40-1.50	0.6-2.0	0.14-0.19	4.5-5.5	Low----------	0.28	5	.5-2
	10-34	35-50	1.45-1.55	0.6-2.0	0.12-0.18	4.5-5.5	Moderate-----	0.24		
	34-65	45-60	1.45-1.55	0.6-2.0	0.12-0.17	4.5-5.5	Moderate-----	0.24		
Rock outcrop.										
Dm*.										
Dumps										
DuB2, DuC2-------	0-10	18-27	1.40-1.55	0.6-2.0	0.17-0.20	4.5-6.0	Low----------	0.32	5	.5-2
Dunmore	10-65	40-65	1.40-1.55	0.6-2.0	0.12-0.17	4.5-5.5	Moderate-----	0.20		
DuC3--------	0-4	30-45	1.40-1.55	0.6-2.0	0.15-0.18	4.5-5.5	Low----------	0.28	5	<1
Dunmore	4-65	40-65	1.40-1.55	0.6-2.0	0.12-0.17	4.5-5.5	Moderate-----	0.20		
DuD2--------	0-10	18-27	1.40-1.55	0.6-2.0	0.17-0.20	4.5-6.0	Low----------	0.32	5	.5-2
Dunmore	10-65	40-65	1.40-1.55	0.6-2.0	0.12-0.17	4.5-5.5	Moderate-----	0.20		
DuD3--------	0-4	30-45	1.40-1.55	0.6-2.0	0.15-0.18	4.5-5.5	Low----------	0.28	5	<1
Dunmore	4-65	40-65	1.40-1.55	0.6-2.0	0.12-0.17	4.5-5.5	Moderate-----	0.20		
DuE2--------	0-10	18-27	1.40-1.55	0.6-2.0	0.17-0.20	4.5-6.0	Low----------	0.32	5	.5-2
Dunmore	10-65	40-65	1.40-1.55	0.6-2.0	0.12-0.17	4.5-5.5	Moderate-----	0.20		
DuE3--------	0-4	30-45	1.40-1.55	0.6-2.0	0.15-0.18	4.5-5.5	Low----------	0.28	5	<1
Dunmore	4-65	40-65	1.40-1.55	0.6-2.0	0.12-0.17	4.5-5.5	Moderate-----	0.20		
DwE3*:										
Dunmore---------	0-10	30-45	1.40-1.55	0.6-2.0	0.15-0.18	4.5-5.5	Low----------	0.28	5	<1
	10-65	40-65	1.40-1.55	0.6-2.0	0.12-0.17	4.5-5.5	Moderate-----	0.20		
Fullerton-------	0-8	27-40	1.45-1.55	0.6-2.0	0.10-0.15	4.5-5.5	Low----------	0.24	5	<1
	8-17	23-35	1.45-1.55	0.6-2.0	0.10-0.15	4.5-5.5	Low----------	0.24		
	17-65	40-70	1.45-1.55	0.6-2.0	0.10-0.14	4.5-5.5	Moderate-----	0.20		

See footnote at end of table.

Table 15.--Physical and Chemical Properties of the Soils--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
DxE2*:										
Dunmore	0-10	18-27	1.40-1.55	0.6-2.0	0.17-0.20	4.5-6.0	Low	0.32	5	.5-2
	10-65	40-65	1.40-1.55	0.6-2.0	0.12-0.17	4.5-5.5	Moderate	0.20		
Fullerton	0-8	15-27	1.45-1.55	0.6-2.0	0.10-0.16	4.5-5.5	Low	0.28	5	.5-2
	8-17	23-35	1.45-1.55	0.6-2.0	0.10-0.15	4.5-5.5	Low	0.24		
	17-65	40-70	1.45-1.55	0.6-2.0	0.10-0.14	4.5-5.5	Moderate	0.20		
Em	0-7	20-35	1.20-1.40	0.6-2.0	0.17-0.21	5.1-6.0	Low	0.37	5	1-3
Emory	7-52	20-35	1.25-1.45	0.6-2.0	0.17-0.21	5.1-6.0	Low	0.37		
	52-60	32-45	1.35-1.55	0.6-2.0	0.16-0.20	5.1-6.0	Low	0.37		
En	0-8	12-25	1.30-1.45	2.0-6.0	0.10-0.15	4.5-6.0	Low	0.28	5	1-2
Ennis	8-30	15-27	1.30-1.50	2.0-6.0	0.08-0.15	4.5-6.0	Low	0.28		
	30-60	10-25	1.35-1.50	2.0-6.0	0.06-0.14	4.5-6.0	Low	0.20		
EtB, EtC, EtD	0-10	15-27	1.30-1.45	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.37	5	1-3
Etowah	10-40	23-35	1.35-1.50	0.6-2.0	0.16-0.20	4.5-5.5	Low	0.32		
	40-65	32-45	1.40-1.55	0.6-2.0	0.16-0.20	4.5-5.5	Low	0.32		
FaE2	0-6	18-27	1.30-1.50	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.37	4	1-2
Farragut	6-51	35-55	1.30-1.45	0.6-2.0	0.12-0.15	4.5-5.5	Moderate	0.24		
	51-65	35-55	1.30-1.45	0.2-0.6	0.06-0.09	4.5-5.5	Low	0.24		
FuC2, FuD2, FuE2-	0-8	15-27	1.45-1.55	0.6-2.0	0.10-0.16	4.5-5.5	Low	0.28	5	.5-2
Fullerton	8-17	23-35	1.45-1.55	0.6-2.0	0.10-0.15	4.5-5.5	Low	0.24		
	17-65	40-70	1.45-1.55	0.6-2.0	0.10-0.14	4.5-5.5	Moderate	0.20		
GpD2, GpF	0-6	15-27	1.20-1.40	0.6-2.0	0.12-0.16	3.6-5.5	Low	0.24	3	.5-2
Gilpin	6-26	18-35	1.20-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low	0.24		
	26-32	15-35	1.20-1.50	0.6-2.0	0.08-0.12	3.6-5.5	Low	0.24		
	32	---	---	---	---	---	---	---		
GuE3*:										
Gullied land.										
Dandridge	0-5	25-45	1.40-1.50	0.6-2.0	0.08-0.14	6.1-7.8	Low	0.17	1	<1
	5-13	35-50	1.40-1.55	0.2-0.6	0.06-0.10	6.1-7.8	Moderate	0.17		
	13-25	---	---	---	---	---	---	---		
Ln	0-10	15-27	1.20-1.40	0.6-2.0	0.20-0.26	5.1-7.8	Low	0.32	5	1-3
Lindside	10-46	18-35	1.20-1.40	0.2-2.0	0.17-0.22	5.1-7.8	Low	0.37		
	46-60	18-35	1.20-1.40	0.2-6.0	0.12-0.18	5.6-7.8	Low	0.32		
MnC	0-9	15-30	1.30-1.45	2.0-6.0	0.14-0.18	4.5-5.5	Low	0.28	5	.5-2
Minvale	9-42	20-35	1.40-1.55	0.6-2.0	0.12-0.18	4.5-5.5	Low	0.28		
	42-65	25-45	1.40-1.55	0.6-2.0	0.11-0.17	4.5-5.5	Low	0.28		
MoC, MoD	0-8	7-27	1.25-1.45	0.6-2.0	0.09-0.18	4.5-6.0	Low	0.28	1	.5-2
Montevallo	8-16	15-35	1.25-1.50	0.6-2.0	0.02-0.12	4.5-6.0	Low	0.32		
	16-38	---	---	---	---	---	---	---		
MpE*:										
Montevallo	0-5	7-27	1.25-1.45	0.6-2.0	0.09-0.18	4.5-6.0	Low	0.28	1	.5-2
	5-14	15-35	1.25-1.50	0.6-2.0	0.02-0.12	4.5-6.0	Low	0.32		
	14-38	---	---	---	---	---	---	---		
Armuchee	0-10	22-32	1.35-1.45	0.6-2.0	0.12-0.17	4.5-5.5	Low	0.28	3	.5-2
	10-18	37-47	1.40-1.50	0.2-0.6	0.10-0.14	4.5-5.5	Moderate	0.37		
	18-24	35-45	1.40-1.50	0.2-0.6	0.05-0.10	4.5-5.5	Moderate	0.32		
	24-60	---	---	---	---	---	---	---		

See footnote at end of table.

Table 15.--Physical and Chemical Properties of the Soils--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
MuB, MuC	0-9	7-27	1.20-1.40	0.6-2.0	0.16-0.22	4.5-5.5	Low	0.37	3	1-3
Muse	9-44	28-60	1.20-1.65	0.06-0.2	0.10-0.16	4.5-5.5	Moderate	0.28		
	44-60	40-60	1.40-1.65	0.06-0.2	0.08-0.14	4.5-5.5	Moderate	0.28		
	60-68	---	---	---	---	---				
MwE	0-8	10-25	1.20-1.40	0.6-6.0	0.12-0.18	4.5-6.0	Low	0.37	3	.5-2
Muskingum	8-30	18-27	1.20-1.50	0.6-2.0	0.08-0.14	4.5-5.5	Low	0.28		
	30-45	---	---	---	---	---				
Ne	0-6	7-27	1.20-1.40	0.6-2.0	0.15-0.23	5.6-7.8	Low	0.43	5	1-3
Newark	6-30	18-35	1.20-1.45	0.6-2.0	0.18-0.23	5.6-7.8	Low	0.43		
	30-65	12-40	1.30-1.50	0.6-2.0	0.15-0.22	5.6-7.8	Low	0.43		
NkB2, NkC2, NkD2-	0-8	10-20	1.30-1.45	0.6-2.0	0.18-0.22	4.5-6.5	Low	0.28	5	.5-2
Nolichucky	8-15	18-30	1.30-1.45	0.6-2.0	0.08-0.17	4.5-5.5	Low	0.20		
	15-45	25-35	1.40-1.55	0.6-2.0	0.09-0.17	4.5-5.5	Low	0.20		
	45-60	30-50	1.40-1.55	0.6-2.0	0.07-0.15	4.5-5.5	Moderate	0.20		
NmD2	0-8	10-20	1.30-1.45	0.6-2.0	0.08-0.14	4.5-6.5	Low	0.15	5	.5-2
Nolichucky	8-15	18-30	1.30-1.45	0.6-2.0	0.08-0.17	4.5-5.5	Low	0.20		
	15-45	25-35	1.40-1.55	0.6-2.0	0.09-0.17	4.5-5.5	Low	0.20		
	45-60	30-50	1.40-1.55	0.6-2.0	0.07-0.15	4.5-5.5	Moderate	0.20		
No	0-7	12-35	1.20-1.40	0.6-2.0	0.18-0.23	5.6-8.4	Low	0.43	5	1-3
Nolin	7-60	18-35	1.25-1.50	0.6-2.0	0.18-0.23	5.6-8.4	Low	0.43		
Pu	0-12	18-35	1.30-1.50	0.2-0.6	0.18-0.24	3.6-5.5	Moderate	0.43	3	1-3
Purdy	12-50	35-50	1.30-1.60	<0.2	0.12-0.18	3.6-5.5	Moderate	0.32		
	50-65	35-50	1.30-1.60	<0.2	0.10-0.16	3.6-5.5	Moderate	0.32		
RaD*, RaF*:										
Ramsey	0-4	8-25	1.25-1.50	6.0-20	0.09-0.12	4.5-5.5	Low	0.20	1	.5-2
	4-18	8-25	1.20-1.40	6.0-20	0.09-0.12	4.5-5.5	Low	0.17		
	18	---	---	---	---	---				
Rock outcrop.										
SeB2, SeC2	0-5	15-27	1.30-1.50	0.6-2.0	0.17-0.20	4.5-5.5	Low	0.37	3	.5-2
Sequoia	5-35	35-60	1.35-1.55	0.2-0.6	0.08-0.16	4.5-5.5	Moderate	0.24		
	35-50	---	---	---	---	---				
SeC3	0-5	27-45	1.35-1.50	0.6-2.0	0.15-0.19	4.5-5.5	Moderate	0.32	3	<1
Sequoia	5-30	35-60	1.35-1.55	0.2-0.6	0.08-0.16	4.5-5.5	Moderate	0.24		
	30-50	---	---	---	---	---				
SeD2	0-5	15-27	1.30-1.50	0.6-2.0	0.17-0.20	4.5-5.5	Low	0.37	3	.5-2
Sequoia	5-35	35-60	1.35-1.55	0.2-0.6	0.08-0.16	4.5-5.5	Moderate	0.24		
	35-50	---	---	---	---	---				
St	0-28	18-27	1.40-1.60	0.6-2.0	0.15-0.22	5.6-7.3	Low	0.32	5	2-4
Staser	28-65	18-27	1.40-1.60	0.6-6.0	0.07-0.18	5.6-7.3	Low	0.28		
SwB	0-14	12-25	1.35-1.50	0.6-2.0	0.16-0.20	4.5-6.0	Low	0.37	5	1-2
Swafford	14-28	18-32	1.40-1.50	0.6-2.0	0.14-0.20	4.5-6.0	Low	0.32		
	28-48	18-32	1.45-1.60	0.2-0.6	0.13-0.17	4.5-6.0	Low	0.32		
	48-65	18-32	1.40-1.55	0.6-2.0	0.13-0.17	4.5-6.0	Low	0.32		
TaE2*:										
Talbott	0-7	15-27	1.35-1.50	0.6-2.0	0.10-0.18	5.1-6.0	Moderate	0.37	2	.5-2
	7-32	40-60	1.40-1.60	0.2-0.6	0.10-0.14	5.1-6.0	Moderate	0.24		
	32	---	---	---	---	---				

See footnote at end of table.

Table 15.--Physical and Chemical Properties of the Soils--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
TaE2*:										
Rock outcrop.										
TsB	0-13	10-25	1.35-1.45	0.6-2.0	0.17-0.20	4.5-5.5	Low	0.37	5	.5-2
Tasso	13-19	20-35	1.40-1.55	0.6-2.0	0.17-0.19	4.5-5.5	Low	0.32		
	19-33	20-35	1.50-1.70	0.2-0.6	0.10-0.15	4.5-5.5	Low	0.32		
	33-65	30-45	1.35-1.50	0.2-2.0	0.10-0.15	4.5-5.5	Moderate	0.28		
WaC2, WaD2	0-6	10-30	1.40-1.55	0.6-2.0	0.15-0.21	4.5-5.5	Low	0.28	5	.5-2
Waynesboro	6-34	23-35	1.40-1.55	0.6-2.0	0.14-0.20	4.5-5.5	Low	0.28		
	34-65	35-50	1.40-1.55	0.6-2.0	0.13-0.18	4.5-5.5	Low	0.28		
Wb	0-7	18-27	1.35-1.50	0.6-2.0	0.15-0.22	6.1-7.8	Low	0.37	4	1-2
Whitesburg	7-41	25-35	1.35-1.50	0.6-2.0	0.15-0.20	6.1-7.8	Low	0.32		
	41-50	---	---	---	---	---	---	---		

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 16.--Soil and Water Features

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
AeC. Arents											
AnC2, AnD2, AnE--- Allen	B	None	---	---	>6.0	---	---	>60	---	Low	Moderate.
ArD2, ArE3, ArF2-- Armuchee	C	None	---	---	>6.0	---	---	20-40	Soft	Moderate	Moderate.
Be Beason	C	Occasional	Very brief	Dec-Apr	1.0-2.0	Apparent	Dec-Apr	>60	---	High	High.
BoD, BoF Bouldin	B	None	---	---	>6.0	---	---	>60	---	Low	Moderate.
CoB2, CoC2, CoC3, CoD2 Collegedale	C	None	---	---	>6.0	---	---	>60	---	High	Moderate.
CtD2*, CtE2*: Collegedale	C	None	---	---	>6.0	---	---	>60	---	High	Moderate.
Talbott	C	None	---	---	>6.0	---	---	20-40	Hard	High	Moderate.
Rock outcrop.											
DaC2, DaD2, DaD3, DaE3, DaF2 Dandridge	D	None	---	---	>6.0	---	---	10-20	Soft	Low	Low.
DcB2 Decatur	B	None	---	---	>6.0	---	---	>60	---	High	Moderate.
DeC2, DeC3, DeD2, DeD3 Dewey	B	None	---	---	>6.0	---	---	>60	---	High	Moderate.
DfD2*: Dewey	B	None	---	---	>6.0	---	---	>60	---	High	Moderate.
Rock outcrop.											
Dm*. Dumps											
DuB2, DuC2, DuC3, DuD2, DuD3, DuE2, DuE3 Dunmore	B	None	---	---	>6.0	---	---	>60	---	High	Moderate.
DwE3*, DxE2*: Dunmore	B	None	---	---	>6.0	---	---	>60	---	High	Moderate.
Fullerton	B	None	---	---	>6.0	---	---	>60	---	High	Moderate.

See footnote at end of table.

Table 16.--Soil and Water Features--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
Em---------- Emory	B	Rare--------	---	---	5.0-6.0	Apparent	Jan-Mar	>60	---	Moderate	Moderate.
En---------- Ennis	B	Occasional	Very brief	Dec-Mar	>6.0	---	---	>60	---	Low------	Moderate.
EtB, EtC, EtD----- Etowah	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
FaE2---------- Farragut	C	None--------	---	---	>6.0	---	---	>48	Soft	High-----	Moderate.
FuC2, FuD2, FuE2-- Fullerton	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
GpD2, GpF--------- Gilpin	C	None--------	---	---	>6.0	---	---	20-40	Soft	Low------	High.
GuE3*: Gullied land.											
Dandridge--------	D	None--------	---	---	>6.0	---	---	10-20	Soft	Low------	Low.
Ln---------- Lindside	C	Occasional	Very brief or brief.	Dec-Apr	1.5-3.0	Apparent	Jan-Apr	>60	---	Moderate	Low.
MnC---------- Minvale	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low.
MoC, MoD---------- Montevallo	D	None--------	---	---	>6.0	---	---	10-20	Soft	Moderate	Moderate.
MpE*: Montevallo-------	D	None--------	---	---	>6.0	---	---	10-20	Soft	Moderate	Moderate.
Armuchee---------	C	None--------	---	---	>6.0	---	---	20-40	Soft	Moderate	Moderate.
MuB, MuC---------- Muse	C	None--------	---	---	>4.0	Apparent	Jan-Apr	>40	Soft	High-----	High.
MwE---------- Muskingum	C	None--------	---	---	>6.0	---	---	20-40	Soft	Low------	High.
Ne---------- Newark	C	Frequent----	Brief-----	Jan-Apr	0.5-1.5	Apparent	Dec-Apr	>60	---	High-----	Low.
NkB2, NkC2, NkD2, NmD2---------- Nolichucky	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.
No---------- Nolin	B	Occasional	Brief-----	Jan-Apr	3.0-6.0	Apparent	Jan-Mar	>60	---	Low------	Moderate.
Pu---------- Purdy	D	None--------	---	---	+1-1.0	Apparent	Dec-Jun	>60	---	High-----	High.
RaD*, RaF*: Ramsey-----------	D	None--------	---	---	>6.0	---	---	10-20	Hard	Low------	Moderate.
Rock outcrop.											

See footnote at end of table.

Table 16.--Soil and Water Features--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
SeB2, SeC2, SeC3, SeD2---------- Sequoia	C	None	---	---	>6.0	---	---	20-40	Soft	High	Moderate.
St---------- Staser	B	Rare	---	---	3.0-4.0	Apparent	Jan-Mar	>60	---	Low	Low.
SwB---------- Swafford	C	Rare	---	---	2.0-3.0	Perched	Jan-Mar	>60	---	Moderate	Moderate.
TaE2*:											
Talbott----------	C	None	---	---	>6.0	---	---	20-40	Hard	High	Moderate.
Rock outcrop.											
TsB---------- Tasso	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
WaC2, WaD2-------- Waynesboro	B	None	---	---	>6.0	---	---	>60	---	High	High.
Wb---------- Whitesburg	C	Occasional	Very brief	Jan-Apr	2.0-4.0	Apparent	Jan-Mar	40-60	Soft	High	Low.

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 17.--Classification of the Soils

Soil name	Family or higher taxonomic class
Allen	Fine-loamy, siliceous, thermic Typic Paleudults
Arents	Arents
Armuchee	Clayey, mixed, thermic Ochreptic Hapludults
Beason	Clayey, mixed, thermic Aquic Hapludults
Bouldin	Loamy-skeletal, siliceous, mesic Typic Paleudults
Collegedale	Clayey, mixed, thermic Typic Paleudults
Dandridge	Clayey-skeletal, mixed, mesic, shallow Ruptic-Alfic Eutrochrepts
Decatur	Clayey, kaolinitic, thermic Rhodic Paleudults
Dewey	Clayey, kaolinitic, thermic Typic Paleudults
Dunmore	Clayey, kaolinitic, mesic Typic Paleudults
Emory	Fine-silty, siliceous, thermic Fluventic Umbric Dystrochrepts
Ennis	Fine-loamy, siliceous, thermic Fluventic Dystrochrepts
Etowah	Fine-loamy, siliceous, thermic Typic Paleudults
Farragut	Clayey, mixed, thermic Humic Hapludults
Fullerton	Clayey, kaolinitic, thermic Typic Paleudults
Gilpin	Fine-loamy, mixed, mesic Typic Hapludults
Lindside	Fine-silty, mixed, mesic Fluvaquentic Eutrochrepts
Minvale	Fine-loamy, siliceous, thermic Typic Paleudults
Montevallo	Loamy-skeletal, mixed, thermic, shallow Typic Dystrochrepts
Muse	Clayey, mixed, mesic Typic Hapludults
Muskingum	Fine-loamy, mixed, mesic Typic Dystrochrepts
Newark	Fine-silty, mixed, nonacid, mesic Aeric Fluvaquents
Nolichucky	Fine-loamy, siliceous, mesic Typic Paleudults
Nolin	Fine-silty, mixed, mesic Dystric Fluventic Eutrochrepts
Purdy	Clayey, mixed, mesic Typic Ochraquults
Ramsey	Loamy, siliceous, mesic Lithic Dystrochrepts
Sequoia	Clayey, mixed, mesic Typic Hapludults
Staser	Fine-loamy, mixed, thermic Cumulic Hapludolls
Swafford	Fine-loamy, siliceous, thermic Fragiaquic Paleudults
Talbott	Fine, mixed, thermic Typic Hapludalfs
Tasso	Fine-loamy, siliceous, thermic Fragic Paleudults
Waynesboro	Clayey, kaolinitic, thermic Typic Paleudults
Whitesburg	Fine-loamy, siliceous, mesic Aquic Dystric Eutrochrepts